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Telephony

THE JOURNAL OF THE
TELEPHONE INDUSTRY
SINCE 1901

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Guaranteed Circulation This Issue
13,315 of Which 12,655 Is Paid

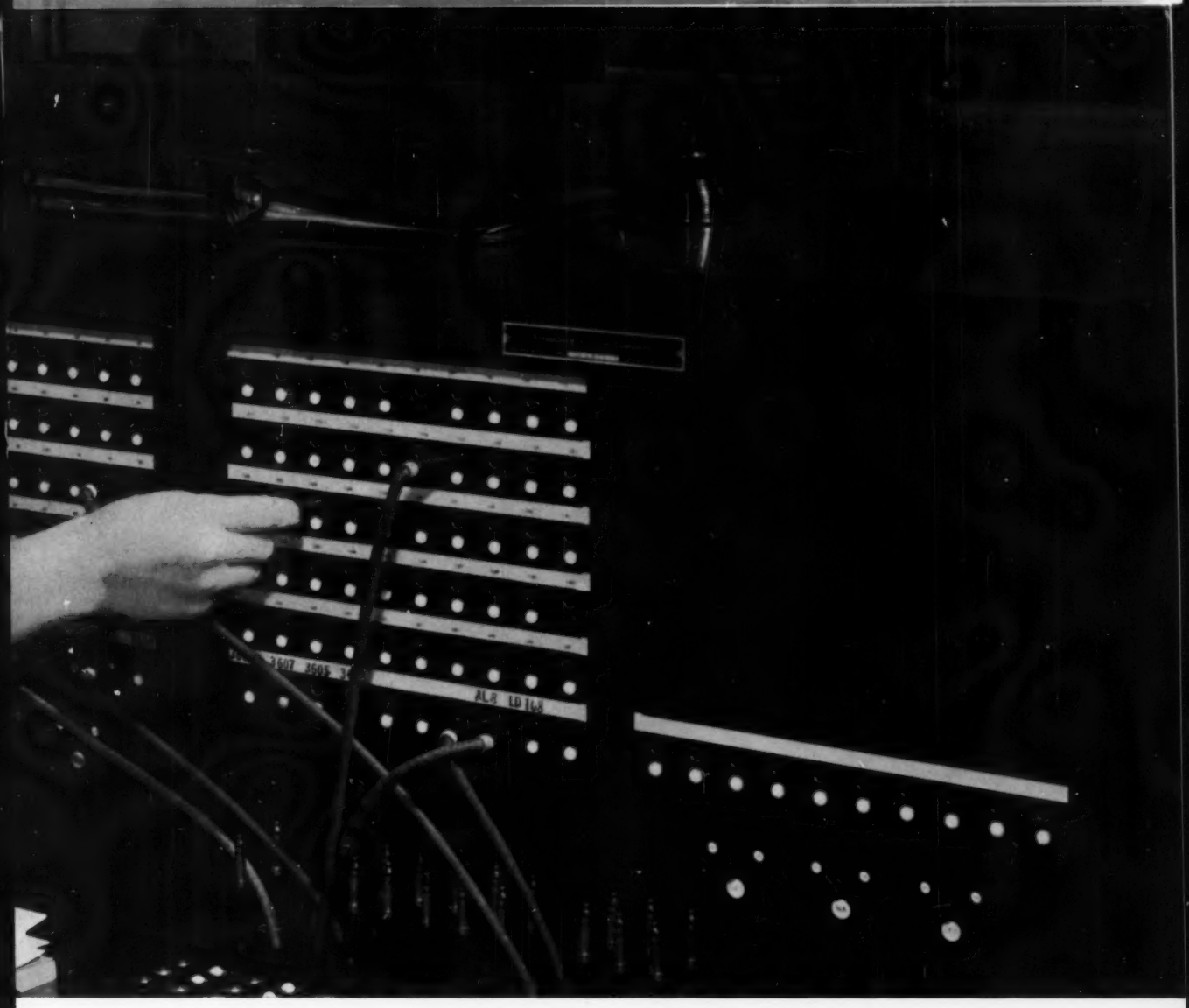
PRE-CONVENTION ISSUE

USITA STAFF

Our Technical Editorial Director, Ray Blain, found members of USITA Washington headquarters staff in a jovial mood when he called to take the above photo. See p. 34 for names.

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

Big capacity with provision for growth



Your larger commercial subscribers *prefer* the Stromberg-Carlson No. 131 Switchboard for its big, easily expandable capacity . . . its fast, efficient handling of heavy traffic.

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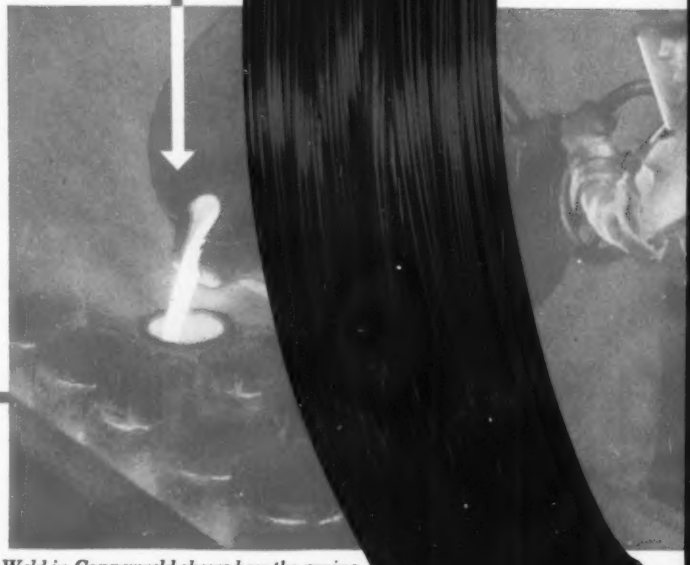
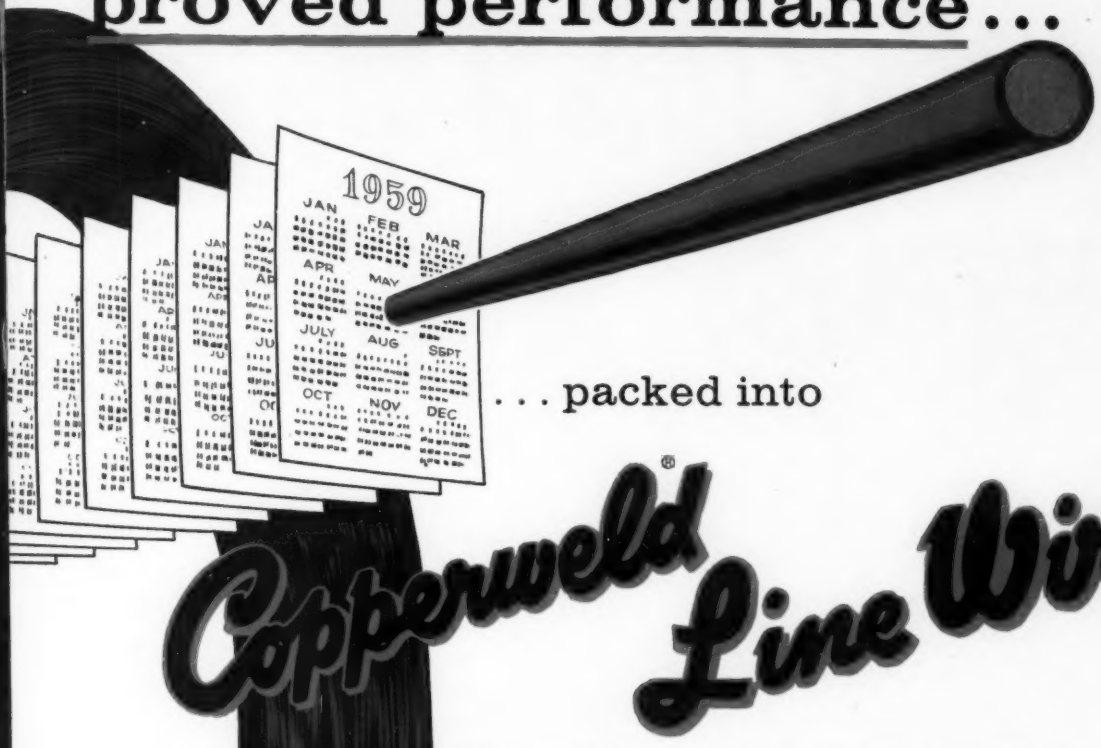
By this exclusive process, molten copper is poured around a heated alloy steel billet to produce a perfect weld that permanently and inseparably interlocks the two metals. As a result, they perform as a single material which combines the high conductivity, long life and rust resistance of copper with the rugged strength of high-tensile steel.



This microphotograph of the Molten-Weld in Copperweld shows how the grains of copper and steel interlock to form a permanent, continuous weld. Copperweld is the only company producing wire which has this inseparable weld.

proved performance...



. . . packed into

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When you string Copperweld Line Wire, you're playing it safe. You don't have to wonder how it will perform in your circuits. Copperweld's excellent talking qualities, its long life, permanent high strength and its ability to stand up even under the most adverse operating conditions have been demonstrated, all around the world, for 44 long years.

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We'll be in Room 542A at the USITA Convention. Please visit us.

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BETTER TO LOOK AT! Choice of 15 attractive colors to match all decors, whether for home, school or business: red, yellow, green, blue, beige, grey, ivory, turquoise, rose pink, aqua blue, light beige, light grey, white, brown, black. Available in standard desk or the new, popular wall models.

BETTER TO LISTEN TO! Surpasses all previous instrument performances! Completely engineered to set a new standard of excellence for independent telephony. Varistors provide proper level of voice transmission; incorporate acoustic peak suppression.

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the Kellogg K-500

BETTER INSIDE! Designed for top performance, using highest quality components throughout. Receiver, transmitter, ringer are new in principle, design and performance; the network is a compact, sealed housing. The single-lobed dial cam provides more uniform pulses; the new number plate makes for faster, surer dialing.

Kellogg's K-500 series is your best answer to assure subscriber satisfaction and long, reliable service. Ask your local Kellogg representative to explain the new monthly shipment plan for K-500s: it guarantees you a steady supply of these wanted telephones —at lowest unit cost.

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FLASHES AND PLUGS

BITTENBINDER, CASHAW, DINKELSPIEL & EGISIN. Our Buffalo, N. Y. correspondent relays the news that in his town, it seems, PBX operators are doing more than the usual amount of verbal gymnastics when they identify their companies.

Says one operator, who has to answer "Palmer, Heffernan, Wickser and Goetz" many times a day: "It was difficult answering the telephone when I started to work for the Palmer firm. I'd mispronounce 'Heffernan' and get so rattled that I couldn't say 'Wickser.' But the people were understanding."

After three months of practice, she was tossing off the words quite smoothly. But—you try it, suggests our correspondent—"It's as bad as the old tongue-twister, 'Peter Piper picked a peck of pickled peppers.'"

An operator for a law firm in Buffalo greets her telephone callers glibly with "Good afternoon—Hodgson, Russ, Andrew and Goodyear." Her secret of a smooth greeting with this four-word name is simply that "I always try to pronounce the names slowly."

Another challenging mouthful is spoken by operators for a company who are required to say "Williams, Williams, Volgenau and Tisdall."

Of course, such verbal juggling has led to some short-cuts. Seven other Buffalo companies with long names revealed that they answer with just the telephone number, or in some cases, give the first two names of the company title.

"We have always given the telephone number when people call," explains Marie E. Harder, switchboard operator for Hamilton, Dobmeier, Connelly and Kirchgraver. "Our patrons recognize my voice because I have worked here for 17 years. Sometimes, persons ask, 'What place is this?'" she added. "Then I go into more detail."

Opines TELEPHONY's correspondent, "If firm names become any more complicated, speech teachers will be able to replace 'Peter Piper' with the telephone book."

•

BOMBSHELL. The young lady who was applying for a job with a telephone company didn't hesitate when she came to the little square headed "Age."

She simply wrote "Atomic."

•

HE WAS THERE, BUT "SHOOK." Now and then, when some unforseen circumstance, such as "an act of God" occurs and disrupts telephone service, even temporary deprivation demonstrates again the vital part the telephone plays in all our lives.

In the recent earthquake disaster in West Yellowstone, Mont., Tom W. Showalter, managing editor of the Crawfordsville, Ind. *Journal Review*, who was on the scene when the tremors hit, loudly bewailed his fate, "It's the first time in my life I've ever had a big story dumped right in my lap—and no telephones."

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Dept. of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

September 26, 1959

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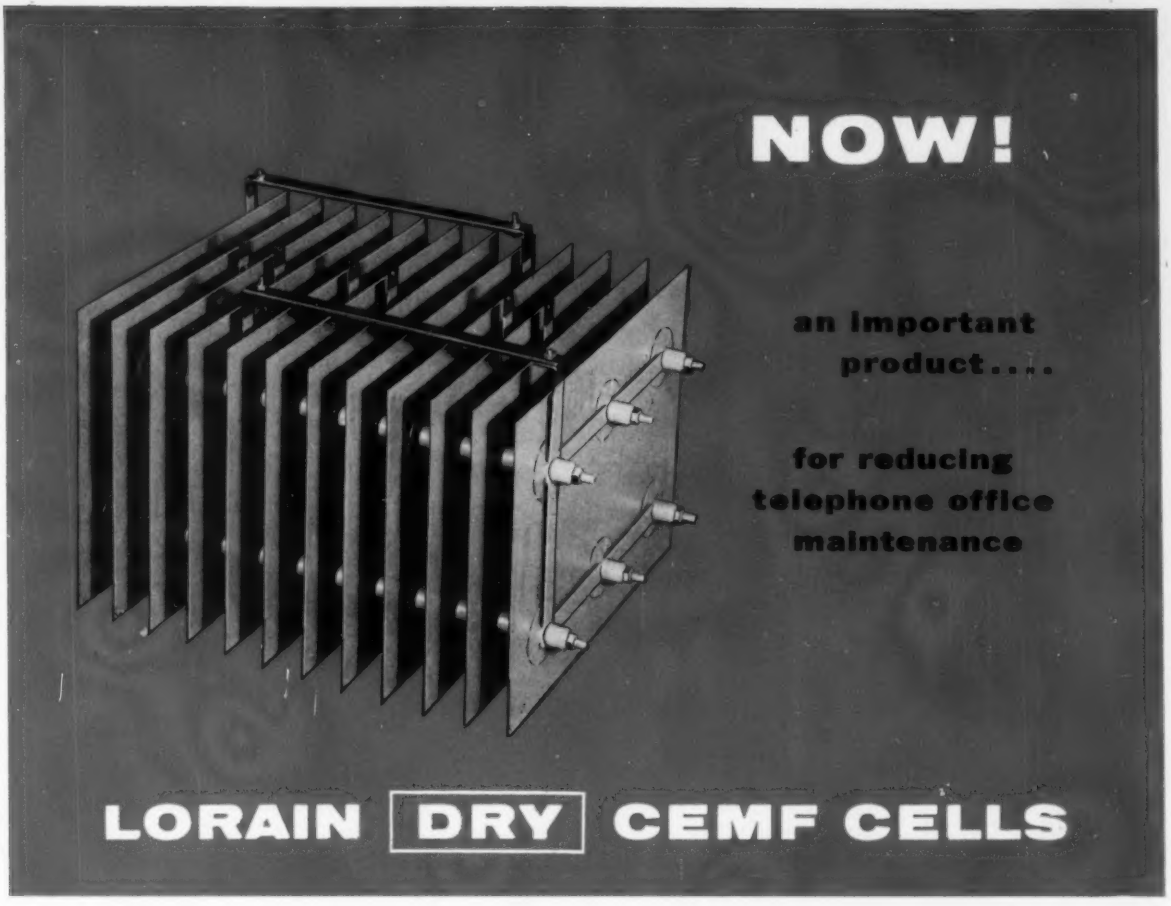

UNRESTRICTED RANGE OF VOLTAGE AND CURRENT RATINGS

- no routine maintenance
- light weight, portable
- mounts in any position
- not damaged by freezing
- non-corrosive
- obtainable in any size

Now available in all sizes, Lorain Dry CEMF Cells eliminate the maintenance problems associated with liquid-filled cells. Their light weight, portability, safety, and their unrestricted range of voltage and current ratings also adapt them for use as voltage regulating elements in many applications in which wet cells could not be used. They do not give off gases, do not employ liquids, are relatively insensitive to shock, and do not require maintenance or periodic attention. Lorain Dry CEMF Cells, therefore, can be installed wherever most convenient, making possible considerable economies in wiring, mounting racks, and floor space.

Lorain Dry CEMF Cells are selenium covered metal plates, specially treated so their internal resistance decreases rapidly as the current flow through them increases, making them effective as voltage regulators. The amount of voltage drop is determined by the number of plates connected in series. Bulletin 176 lists representative sizes; assemblies to meet individual specifications are readily made to order. Specific recommendations will be made upon receipt of the current and voltage limits to be met, and the preferred mounting arrangement.

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our equipment is sold through leading telephone distributors

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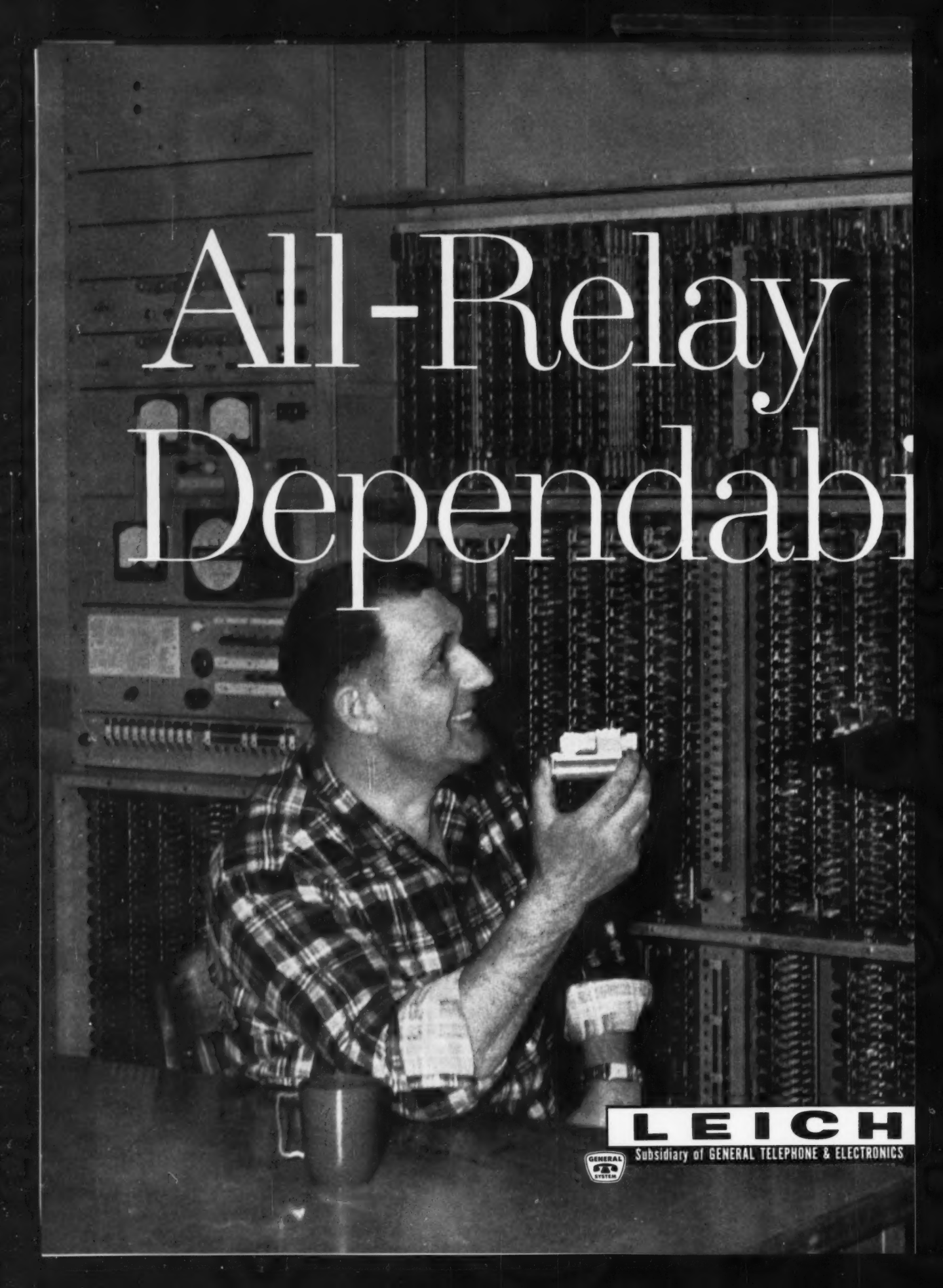
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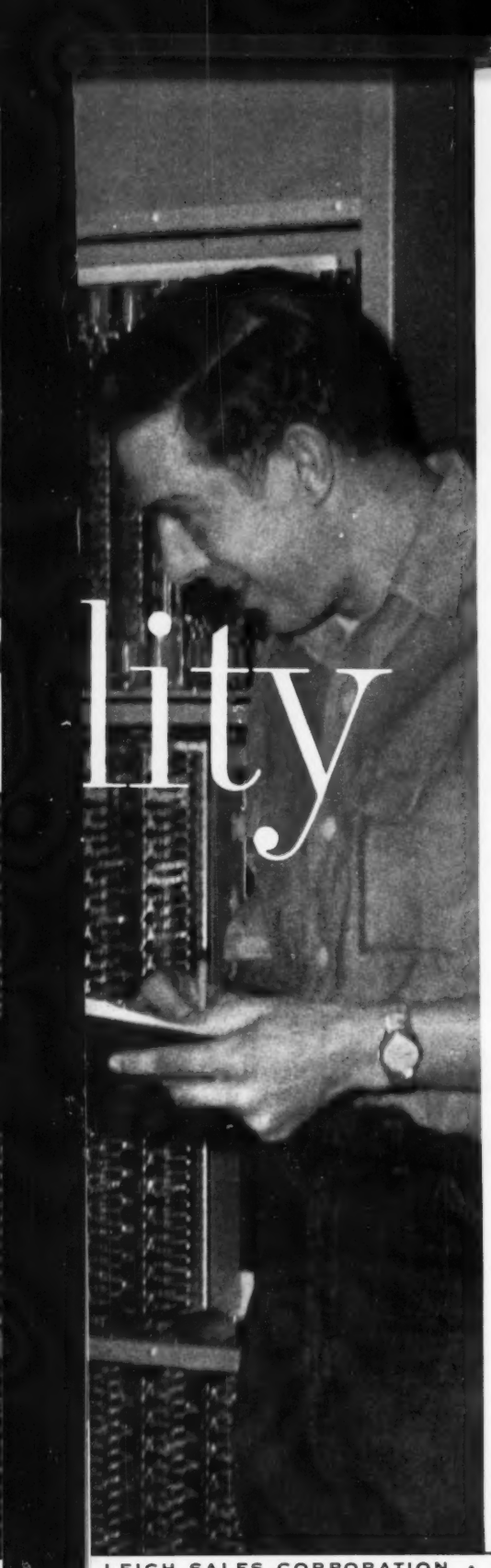
GENERAL SYSTEM



lity

MONEY-SAVING FEATURES OF THE LEICH DIAL SYSTEM

reduces maintenance for over 1,000 exchanges

The owners of 1,000 small and medium size Leich Dial Systems are the best salesmen Leich has. They recommend Leich's all-relay equipment because it cuts their maintenance cost to the bone.

Since the Leich Dial System is all-relay, there's simply less to go wrong. It eliminates mechanical switching mechanisms which are apt to wear or require maintenance or adjustment. Then, too, Leich relays have been tested for millions of operations without failure.

Surveys show that Leich's Dial System requires less upkeep than any other switching equipment. These surveys are based on actual cost-per-station reports made by telephone companies.

A few of the 1,000 exchanges that cut maintenance costs with the Leich Dial System are listed here.

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manufacturers of telephones, switchboards and related apparatus since 1907

"But, Roy, you said

AE Supply Orders must

Stethoscope on your supply order? To Tiny, this idea seems quite normal. After all, the boss repeatedly says that all AE supply orders must be carefully inspected! Poor Roy—if he has enough patience, he may be able to explain the difference between accurate order checking and a hospital examination.

AE doesn't compete with physicians. But, we do check your order carefully before it leaves our warehouse. Whether your supply order is for one item or a thousand, close attention to detail is always an important part of our service. You see, we expect to be in the telephone supply business for many years ahead. And the best way we can do this is to give you *prompt delivery* from a *large stock* of *famous brands*. Contact your AE warehouse. Let us prove again that—at AE, you get all 3.

SEE TINY AT OUR U.S.I.T.A. CONVENTION EXHIBIT, ROOM 509

be carefully inspected!"

at AE you get all 3

PROMPT DELIVERY
LARGE STOCKS
FAMOUS BRANDS

warehouses:

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ON THE MOVE
WITH
NEW SPACE
AT
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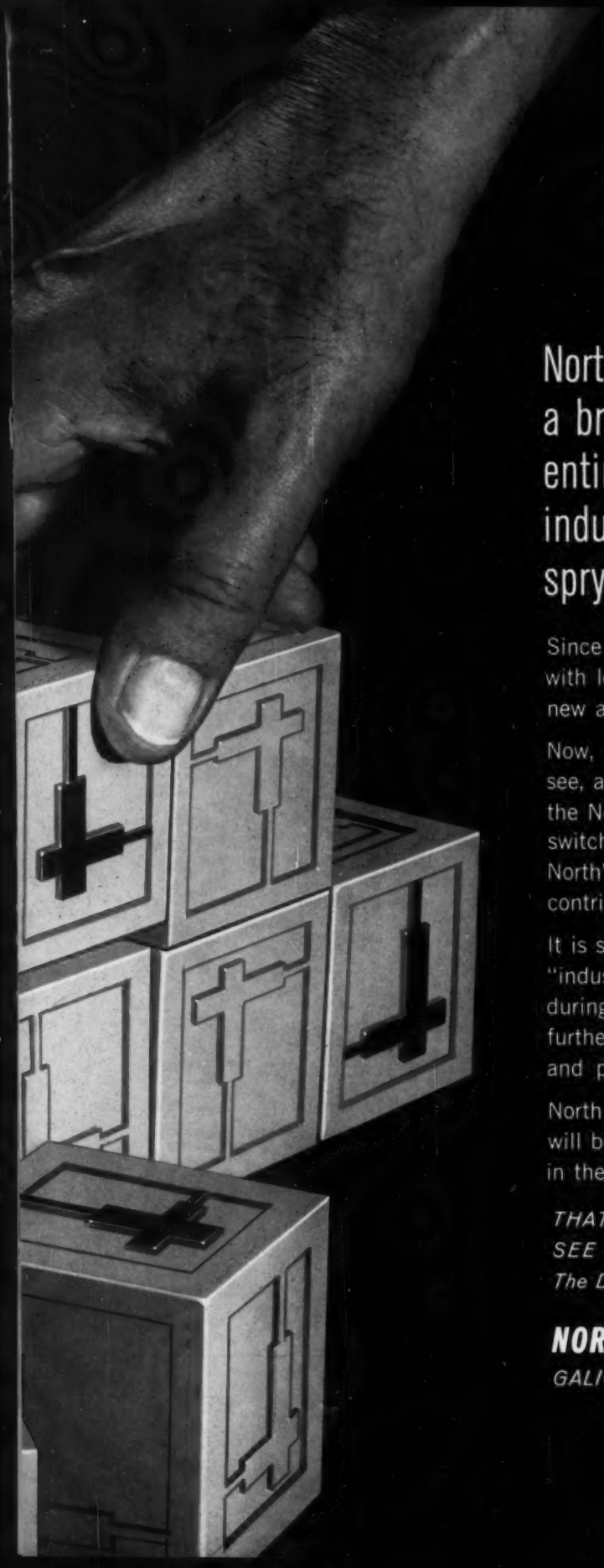
604, 605, 607-A



North is setting a brisk new pace for the entire telephone industry...at the spry young age of 75!

Since 1884 the name North has been synonomous with leadership, industry advancement and new and better equipment for telecommunications.

Now, in 1959, the Telephone Industry will see, at the USITA Convention, the North NX-2 and NX-3 Crossbar switching equipment for smaller exchanges—North's latest, and perhaps greatest, contribution to the industry.

It is significant that the latest "industry first" should be unveiled during North's 75th Anniversary—further evidence North's continued leadership and progressive management!

North Electric Company's displays this year will be in Suite 604, 605, 607-A in the Conrad Hilton.

THAT'S THE SPACE TO SEE THE PACE SET BY
The Dynamic Force In The Telephone Industry

NORTH ELECTRIC COMPANY
GALION, OHIO

NORTH 1884 1959 75TH AND GREATEST YEAR

SEE REX

TELEPHONE WIRE & CABLE
at the
U-S-I-T-A National Convention
Conrad Hilton Hotel, Chicago, Ill.
Room 637A

THE REX CORPORATION
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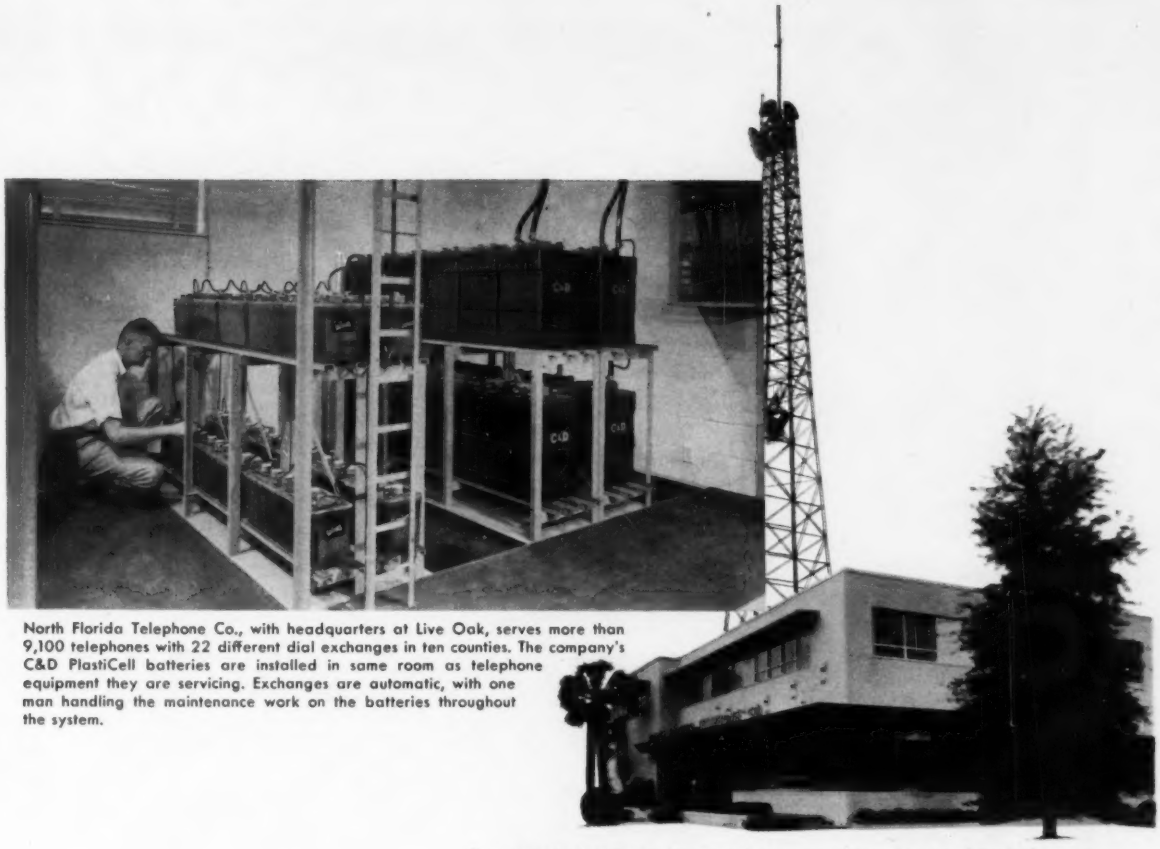

North Florida Telephone Co., with headquarters at Live Oak, serves more than 9,100 telephones with 22 different dial exchanges in ten counties. The company's C&D PlastiCell batteries are installed in same room as telephone equipment they are servicing. Exchanges are automatic, with one man handling the maintenance work on the batteries throughout the system.

dependability, low maintenance, economy, favor battery power by C&D

DEPENDABILITY is the most important factor to consider in battery purchases for telephone exchanges. This is the opinion of North Florida Telephone Co., in Live Oak, Florida. It is the major reason why C&D batteries are installed in many of North Florida's twenty-two exchanges.

LOW MAINTENANCE figures in, too. North Florida includes maintenance costs in arriving at "real" battery power costs. By reducing battery maintenance costs to an average of 2 hours per month per battery including travel time, the company has every expectation of netting substantial over-all economies using C&D PlastiCell* batteries.

There are good reasons for this C&D performance. PlastiCell batteries have full .266″ thick plates—not just the usual .156″ or .220″. In addition, you get triple insulation—not just dual—to keep active materials from shedding off the plates.

PlastiCell lead-antimony grid batteries are built for 14-year life in full-float service. Add the advantages of suspended and supported plate construction, *Hi-Impac* covers, transparent shockproof containers . . . and the many other C&D plus-features, it's easy to see why most telephone men agree:

"C&D is your better battery buy."

Write for literature!
New Bulletin T-533 describes 14-year life PlastiCell (lead-antimony) batteries. T-532 covers 25-year life PlastiCal (lead-calcium) batteries. Send for your copies today!

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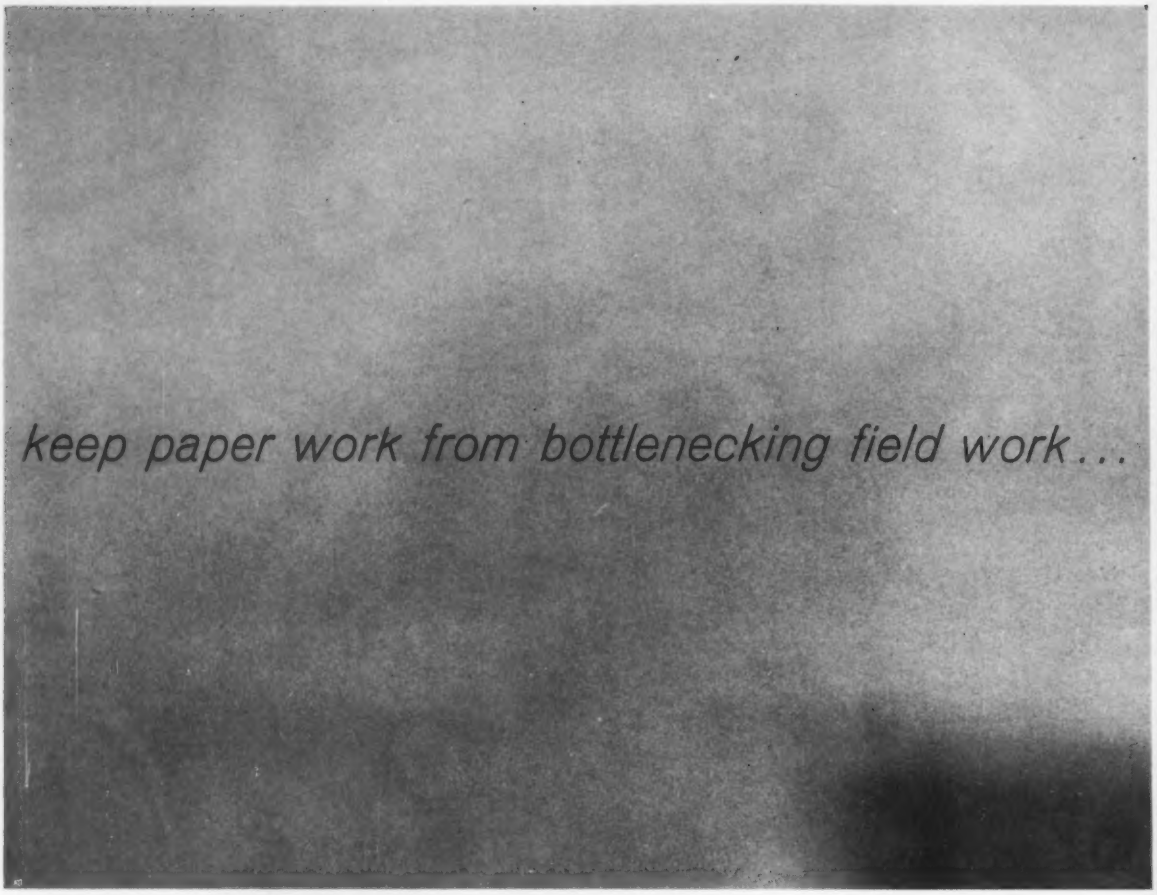
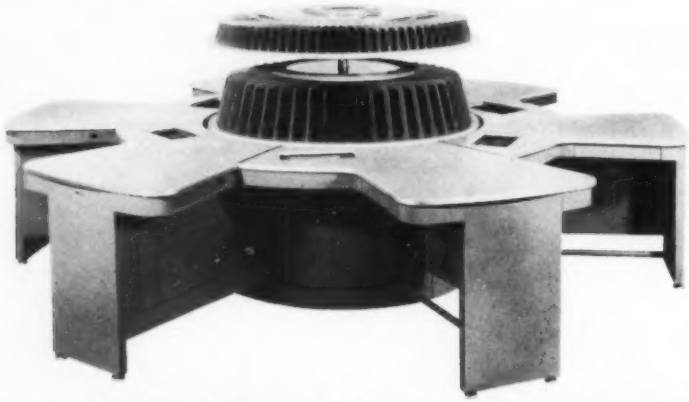
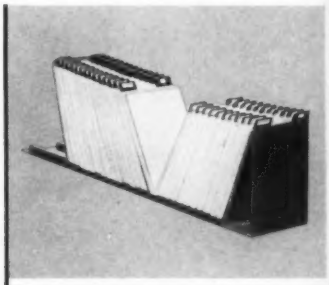


WITH ACME VISIBLE CABLE AND



NEW ACME VISIBLE Push-Button ROTARY makes up to 420,000 cable and terminal records accessible to any worker with electronic speed. A truly **revolutionary** advance in handling cable and terminal records. The work rotates to the user at the touch of a button. From 1, 6, 12 or more workers can use 20,000 to 420,000 records without moving from their desks. No more wasted steps. Per-hour output goes up, fatigue and errors go down. Other types and sizes of space saving Rotaries to speed many other plant and customer-service jobs.

DESIGNED TO TELEPHONE SPECIFICATIONS, by Acme Visible Systems Engineers, working closely with telephone operations experts.



NEW V-ANGLE TRAYS FOR QUICK LINE CARD REFERENCE

Supported V-Angle flips open at any card, then stays open . . . leaving hands free for copying.

Measured Space Control automatically keeps space ready for refiling when card must be removed for changes or replacement.

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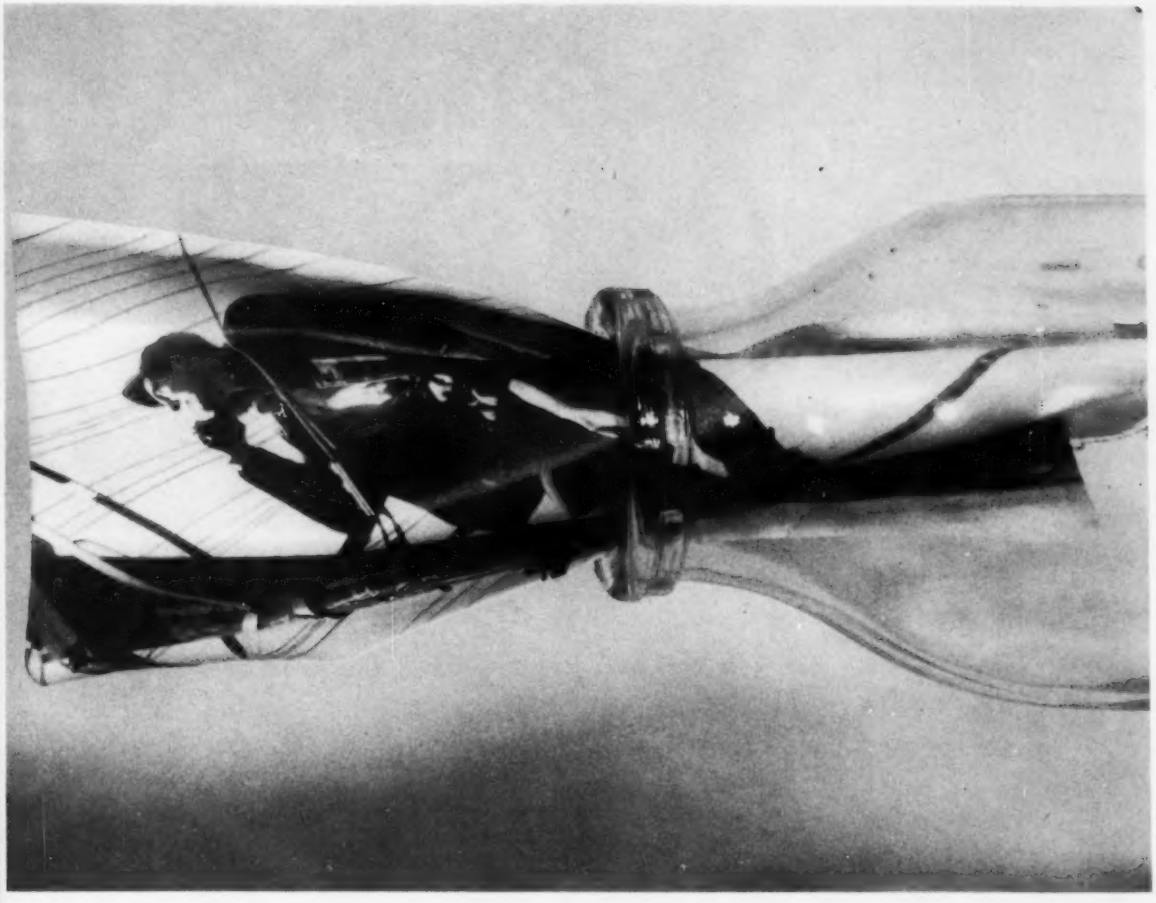

TERMINAL ASSIGNMENT AIDS

HIGH EFFICIENCY ASSIGNMENT–REPAIR DESK

Recess holds line card tray, with cover to provide full desk top when cards are not in use. Vertical card book rack for cable and terminal records. Top shelf available for telephone key equipment. A complete, efficient work station.

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holds 3 V-Angle line card trays, and vertical card book rack for cable and terminal records. Rolls easily on ball-bearing casters. Slip out shelf provides solid work surface while using records.

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in many sizes feature built-in V-Angle opening, measured space control, and variable partitioning to allow future changes in line card width.

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World's Largest Exclusive Makers of Visible Record Systems

Without cost or obligation, please send more information about your new equipment and systems for handling phone records.

We have_____ line cards and _____ cable and terminal records to handle.

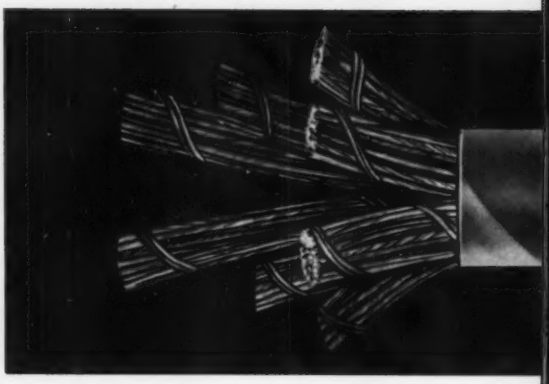
Name_____ Title_____

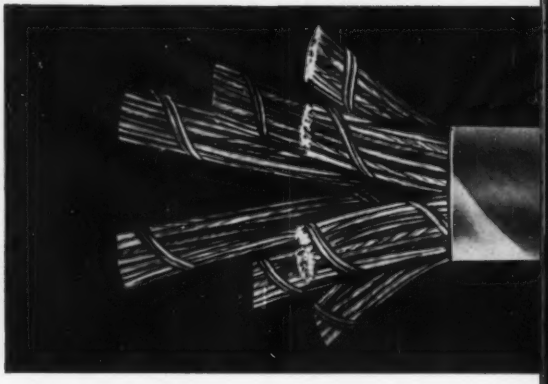
Company_____

Address_____

City_____ Zone____ State_____

THIS CABLE SHEATH IS ALUMINUM





■ light weight ■ great mechanical strength ■ low shield resistance
■ extruded, seamless and impermeable ■ splice with wiped joints

ALS and ALSP are made with the same high quality paper insulated copper conductors used in our Stalpeth and Lead sheathed cables...Core constructions include: paired-units, layers, quads, star quads, composites, combinations, video pairs, low capacitance.

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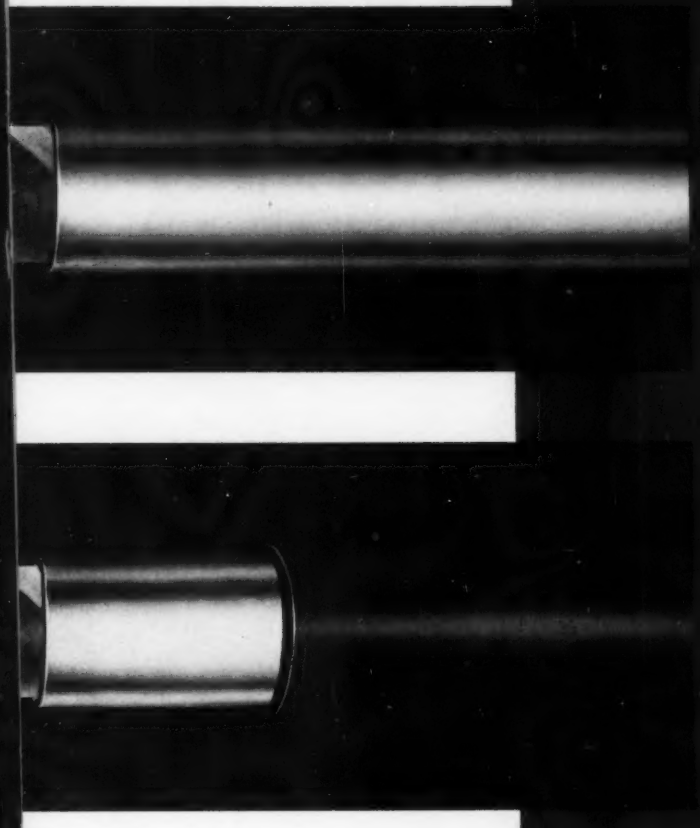
22 Ga.	16 thru 202 pairs
24 Ga.	26 thru 303 pairs
26 Ga.	51 thru 404 pairs



ALS

(Paper Insulated Aluminum Sheathed) for permanent

ALSP

(Paper Insulated Aluminum Sheathed—Polyethylene Jacketed) for direct burial, duct or aerial use. Recommended for aerial installations involving marine atmospheres (sea coast locations) or industrial sites having air-borne concentrations of alkalies or chlorides.

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FRIDAY, OCTOBER 9TH, NBC-TV

The Bell Telephone Hour returns to your television screen, live and in color, on Friday, October 9th—the beginning of a new season of exciting entertainment.

You and your family will see and hear superb musical performances by outstanding artists.

You'll see, too, commercials of special interest to the telephone industry. On October 9th, the commercials will advertise on a nationwide TV network the step-saving, time-saving convenience of extension phones, the importance of good telephone service in our daily lives, and the value of keeping in touch with family and friends by Long Distance.

Consult your local TV listings for time and channel in your community. Friday, October 9th, NBC-TV, 8:30-9:30 p.m., E.S.T.

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in a special program of folk songs
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★ Steel case assemblies available for manhole mounting and direct earth burial.

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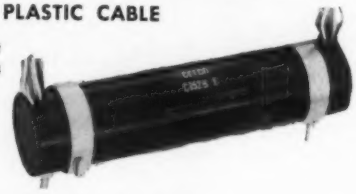
TYPE 167 CASE FOR LEAD CABLE
TYPE 162 CASE FOR PLASTIC CABLE

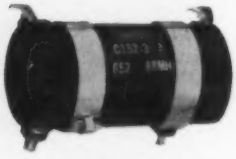
Using one to sixteen Type 632 (88MH), 638 (44MH), 642 (88MH) or 641 (44MH) coils.

TYPE C152 CASE FOR PLASTIC CABLE

Sizes — One to twenty-eight coils. Using Types C652 (88 MH) or 651 (44MH) coils.



READY MOUNT LOADING COIL CASES FOR SPLICING CASES



C152-3 (3 COILS)

C152-1 (1 COIL)

TYPE C152 CASES

Are equipped with one to 26 type 652 (88 MH) or 651 (44MH) coils. For mounting in splicemaker cases.

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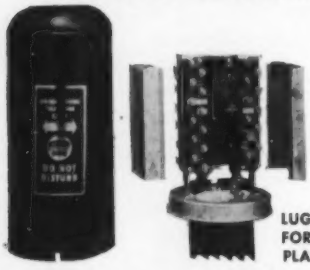
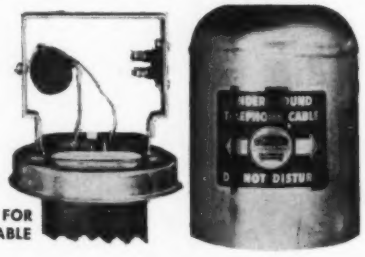


LUG-12 TERMINAL FOR BURIED PLASTIC CABLES

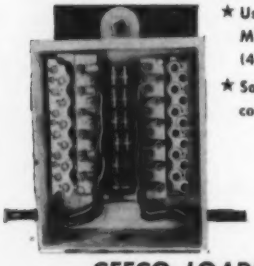
★ Pedestals—Two-piece—six feet long.
★ Pole Brackets—Available for pole mounting.
★ Loading—Load one or more pairs as required.
★ Accessible—For testing, splicing, cross connecting and subscriber distribution.
★ Economical—Buy only what you need —add later.



LU-3 TERMINAL FOR BURIED WIRE AND CABLE

TYPE 177 TERMINALS

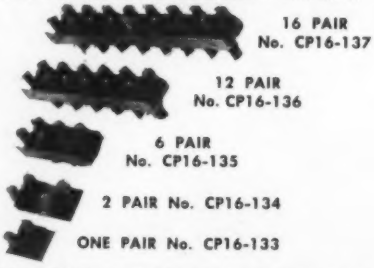
FOR 6 — 11 AND 16 PAIR RURAL DISTRIBUTION WIRE



★ Using Type 637A (88 MH) or Type 637B (44MH) coils.
★ Sold with or without coils.

NONPROTECTED READY MOUNT ASSEMBLIES

(FOR ALL STANDARD PARKWAY TERMINALS)



16 PAIR No. CP16-137
12 PAIR No. CP16-136
6 PAIR No. CP16-135
2 PAIR No. CP16-134
ONE PAIR No. CP16-133

TYPE C16A

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Look for more about TELSTA in the October 24th Issue

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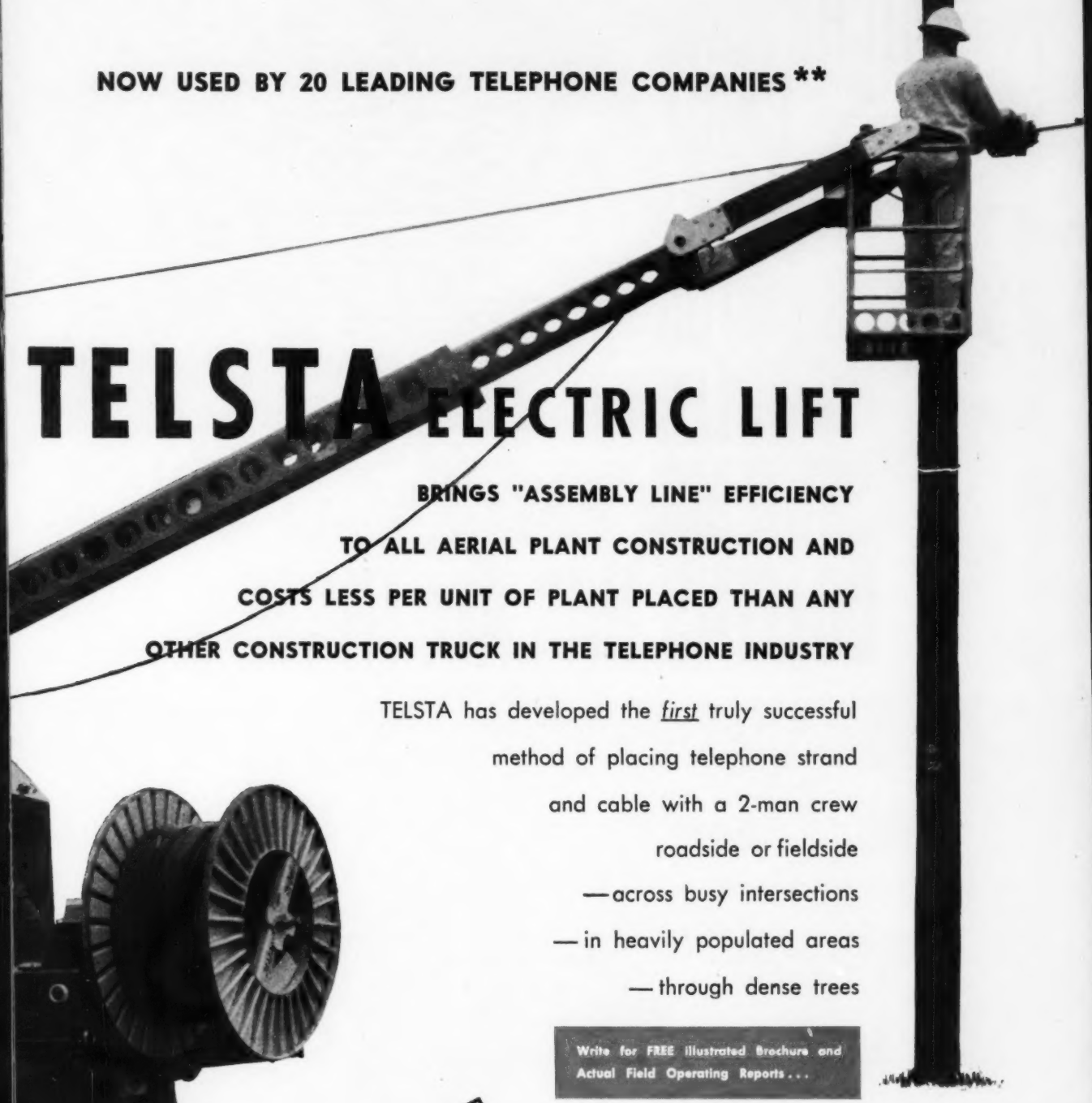

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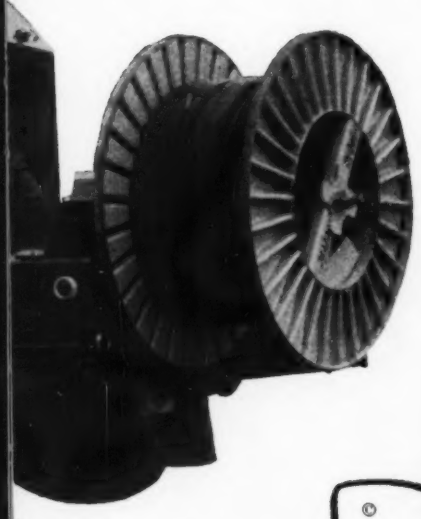

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CABLE
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Carrier channels may be extended to remotely located microwave sites by open wire or cable lines — or small groups of carrier channels may be extended over wire lines to light traffic areas in different directions. Collins Microwave, Open Wire and Cable Carrier Systems are readily integrated with existing wire line and cable facilities as well as with similar types of existing carrier systems.

The Collins MX-102 Microwave Carrier System can provide up to 240 duplex voice channels on an RF path; the WMX-102 Open Wire Carrier, 12 duplex channels on each open wire pair, is available with "NA" or "SA" allocations and is suitable for operation over lines transposed for "C" and "J" type carrier; the CMX-102 Cable Carrier, 24 duplex channels on two cable pairs, is designed for application to "N", "ON" or similar type cable facilities. All use the standard channel bank of 60 to 108 kc, reducing the number of modulations steps required when circuits are extended over several types of transmission media.

Features of Collins Carrier Systems include synchronous operation for efficient data transmission; complete regulation and frequency equalization for the particular transmission medium. Modular construction results in flexible system design, ease of expansion and simplified maintenance. For technical literature, write: Collins Radio Company, Texas Division Sales, 1930 Hi-Line Drive, Dallas 7, Texas.

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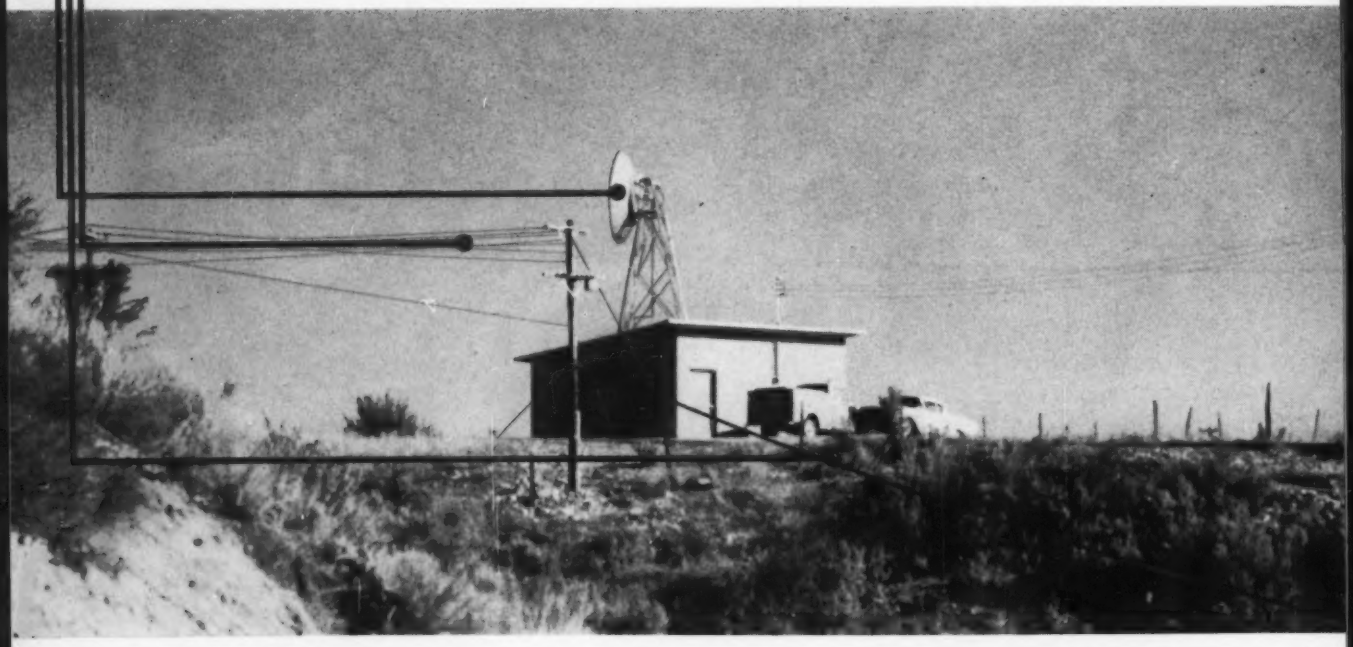

COLLINS

See The Collins Exhibit in Room 661A at the USITA SHOW

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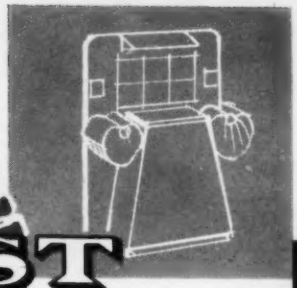

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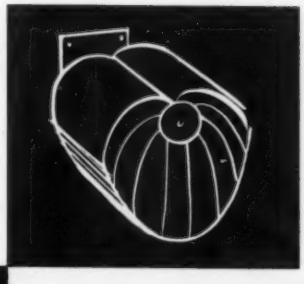

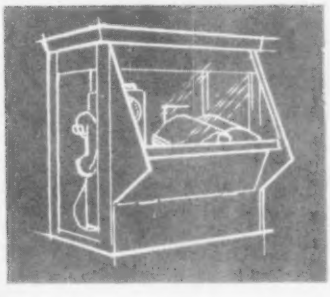

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. . . Makes the best switchboard operator even better. . .

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CORDLESS PBX

What a wonderful benefit to your subscribers! The Leich Cordless PBX makes the best switchboard operator in the business even better. The simplified color-coded keyboard makes her a shade faster on every call because of greater simplicity and automatic features. Also, any regular office girl can be quickly and easily taught to operate this modern, compact switchboard.

Leich's "new look" Cordless handles as many as 20 lines and offers other plus features such as night service, prompt recall, trunk holding and others. Just let subscribers see it and it sells itself!

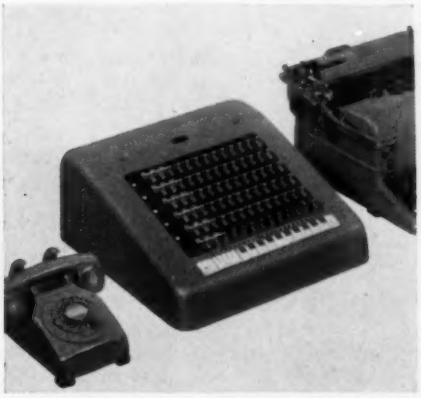
You can give your subscribers excellent service on delivery because these Leich Cordless Switchboards are available from stock.

easy to operate

A novel arrangement of colored keys and low, sloping face permits fast, easy extension of calls without reaching or looking up. Keys are color-coded for greater visibility. Odd numbered station line keys are beige, even numbered black, trunk and operator keys gray.

What's more, each key has only one operative position. This eliminates the confusion of cam-type, two-way keys. To simplify operation further, alternate keys operate in opposite directions.

Supervisory lamps show when a party has disconnected, or is signaling. Busy lamps indicate stations and lines in use.



compact... modern

The Leich PBX is only slightly larger than a typewriter, 16½" long, 16" wide, 7½" high . . . and weighs only about 47 pounds.

It fits easily on the corner of a desk. Plenty of desk space remains for other office duties.

Leich's Cordless gives a new approach to styling. The neat lines and neutral gray finish of the cabinet make an attractive addition to any office. Its sloping face is similar to the latest business machines.

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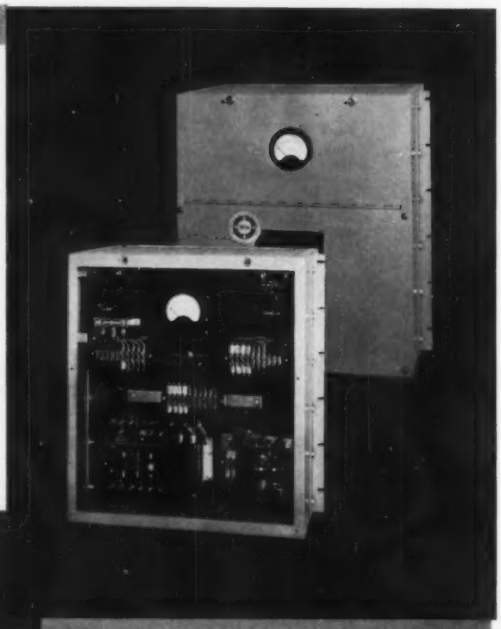

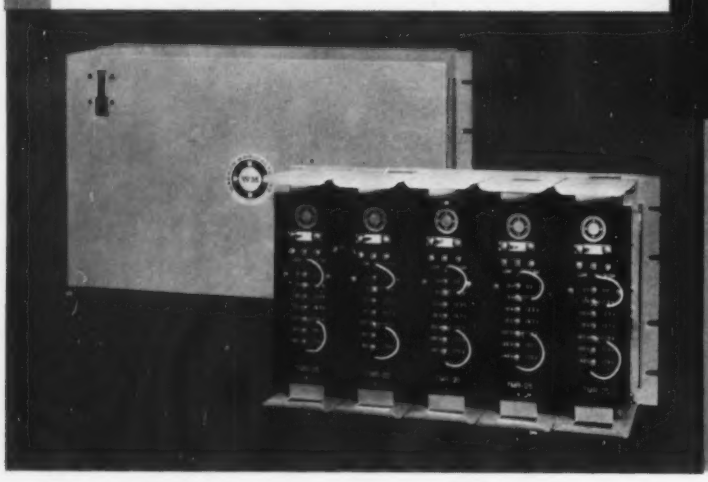

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for warranted dependability

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EDITORIAL

Free Assemblage Vital Freedom

IN APPRAISING the forces which have contributed to the development of the rich spiritual, social and industrial life of America and which have perpetuated our democracy, we Americans are prone to consider lightly the value of one of the most important factors — *the right and privilege of free assemblage.*

So accustomed have we become to this constitutional right to assemble together for any purpose whatever that we take it for granted. Yet no people on earth ever permitted this right to be taken from them without, in time, placing themselves in bondage and at the mercy of political dictators and an all-powerful government. When people lose the right to assemble to worship God as they please, to oppose or condone government decrees, laws and officials; to protect their rights as employers and employes, or to promote ideas and ideals to further their collective welfare, they lose the last vestige of freedom.

There is no indication that we Americans are approaching the loss of this right, but many of us overlook the fact that the only sure way to strengthen and perpetuate it is to take advantage of every opportunity to exercise it.

Industrial conventions—such as the coming annual meeting of the USITA—afford excellent opportunities for the rank and file of specific businesses to exercise the right to meet to discuss and adopt policies designed to protect and further their industrial well-being.

Independent telephone men and women should take advantage of the USITA convention in October to express their faith and belief in the American democratic guarantee of free assemblage and to act in unison to promote the welfare of their industry.

The USITA has a long record of accomplishments and its many activities, during its 62 years of existence, have benefitted all Independent companies—non-members as well as members. (See "You, Too, Can be a Member of the USITA" on page 37.) In fact many of the benefits resulting from its work can be measured in a cold dollar-and-cents "return" by all Independents. Certainly, the USITA, and those who have given so freely of their time in its behalf, can rightfully expect every Independent company to join the association and contribute support to its undertakings to protect and improve the welfare of the Independent segment of the industry.

We, too, believe all Independent companies should support the USITA first, by becoming a member and, second, by attending its annual conventions. This is especially true of the smaller and medium-sized companies, which can use the help and assistance rendered by the association.

TELEPHONY always has urged the smaller companies to become identified with their industry associations, as a part of its long-time program of championing the cause of such companies in their effort to better their financial and operating status. Association secretaries have stated that these efforts have increased interest in their organizations on the part of the small companies and convinced some to join them.

We ask no personal praise or applause for this activity. Our sole interest has been and is directed toward strengthening and solidifying the ranks of the industry, which this magazine and its predecessors have served for 79 years. We will be well compensated for our effort with the benefit it brings to our industry, of which TELEPHONY has been an integral part for so many years.

Sixty-two Years of Service

Your USITA Today

By RAY BLAIN

REALIZING the need for a coordinated effort to further the interest of the Independent telephone industry, a group of its leaders met on June 22, 1897, in Detroit, Mich., and formed the Independent Telephone Association of America. This association has passed through numerous name changes and finally stabilized on the United States Independent Telephone Association (USITA), as we know it today.

The purpose of this organization in the beginning was to "plan joint resistance to any aggression of the American Bell Telephone Co." Fortunately, the Independent and Bell interests later decided to "bury the hatchet" for the good of the industry as a whole.

With the threat of Bell aggression removed, the USITA has since been dedicated to the general welfare of the Independent industry. That purpose, as declared in its by-laws, is to promote the general welfare of the individuals, firms and corporations engaged in providing Independent telephone service in communities in the United States, its territories and possessions.

With the tremendous postwar expansion and growth of the Independent telephone industry, the activities of the association have multiplied and its opportunities for service to Independent companies have increased tremendously. The accomplishments of the hard-working, full-time staff of USITA are outstanding. This staff, housed in the Washington headquarters office, consists of six men, all specialists in their respective fields, seven secretaries and a bookkeeper for a total of 14 employes.

A brief biographical sketch and a summation of the primary duties of each member of this staff will, we believe, give proof as to why it is possible for so much to be accomplished by so few. This summation is furnished briefly as follows:

Executive Vice President Clyde S. Bailey. Mr. Bailey is one of those rare individuals who, though born in Pennsylvania, has been almost a life-long resident of the District of Columbia. A lawyer by profession, he entered the telephone field by way of commission regulation. He served for some years as assistant general solicitor of the NARUC. His principal USITA duties include:

(1) Attention to all national legislation of concern to the telephone industry.

FRONT COVER PHOTO

These members of the USITA Washington headquarters staff are seated, left to right: Mervin H. Alexander, toll engineer; George C. Richert, secretary and engineer; Courtney S. Snyder, assistant secretary and accountant; Clyde S. Bailey, executive vice president; Thomas Warner, radio engineer, and Leon F. Roberts, director of information.

Standing, left to right, are Helen Abrams, Mary E. Dellinger, Georgianne Adams, Barbara D. Hude, Lois Jolley, Mary Lee, Edna L. Switzer and Mary Jane Rawson.

(2) Execution of broad policies as determined by the board of directors.
(3) Maintenance of liaison with appropriate government agencies.
(4) Maintenance of necessary contacts in Washington with executives of member companies.
(5) Formulation of plans and arrangements for the association's annual convention.

Secretary and Engineer George C. Richert. Before joining USITA in 1947, Mr. Richert was employed for 15 years by the Bell Telephone Co. of Pennsylvania in various capacities, including commercial representative, sales engineering, and commercial engineering. During the war, he served in Washington with the Communications Division of the War Production Board and as communications consultant to various federal agencies. His principal duties with the association are to:

(1) Act as secretary and keep the minutes and records of the Association.
(2) Prepare statements of dues of member companies and make collection thereof.
(3) Act as engineer for the Association and secretary of various technical committees.
(4) Conduct correspondence with member companies on engineering and technical problems.
(5) Supervise the preparation of the annual statistical report.
(6) Act as office manager, employ and supervise all clerical personnel.

Director of Information Leon F. Roberts. After serving as mayor of Jamestown, N. Y., Mr. Roberts was commercial manager of the Jamestown Telephone Corp. for five years. He then joined the Gary Group in Chicago as general representative. Later, he was

made vice president in charge of commercial activities and public relations of the Ohio Consolidated Telephone Co. at Portsmouth, O., and then assistant to the president of the Illinois Telephone Co. at Bloomington, Ill. From there, he went with the USITA in February, 1955. His principal duties consist of:

(1) Preparation and release of information to news agencies to promote the interests of the Independent telephone industry.

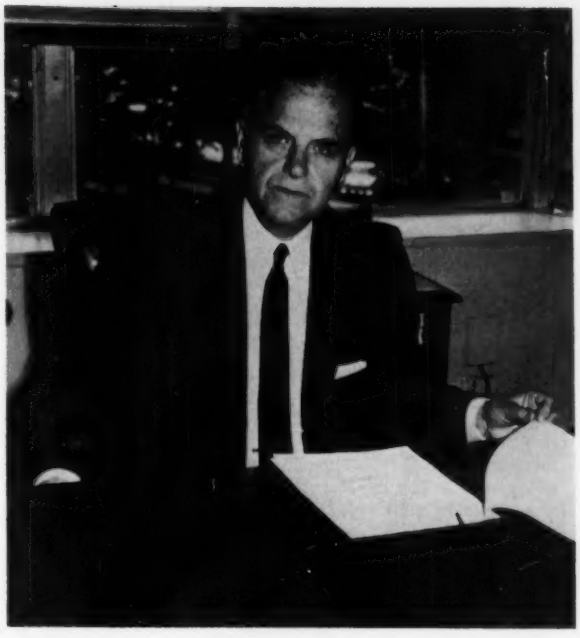
(2) Coordination of the association's national advertising program.

(3) Preparing member letters to the association membership.

(4) Membership solicitation.

(5) Coordinating USITA objectives with state association officers and their activities.

(6) Conducting correspondence with member companies on all matters except engineering, technical problems, legislation and association policy.



Clyde S. Bailey, executive vice president of the USITA seated at his desk in the association's Washington headquarters. Mr. Bailey joined the USITA in 1940 and has been its executive officer since 1943.

Toll Engineer Mervin H. Alexander. Mr. Alexander joined the staff of USITA in April, 1956. He came from Taft, Cal., where he was general plant manager of the Kern Mutual Telephone Co. Previously, he was in the employ of the Pacific Telephone & Telegraph Co. for a period of 17 years. During the war he served three years as a communications officer in the U. S. Air Force.

The duties of the USITA Toll Engineer are to make continuing reviews of toll settlement arrangements and practices, and prepare procedures suitable for use by Independent telephone companies and the association's Toll Compensation and Settlements Committee in connection with studies to obtain data for the following purposes:

(1) To test the adequacy of compensation to Independent companies for expense in connection with the handling of traffic interchanged with Bell System companies.

(2) To test the adequacy of compensation to Independent companies for the use of facilities and equipment in handling business interchanged with Bell System companies.

The Toll Engineer also:

(1) Seeks participation by Independent telephone companies in toll studies and summarizes the data obtained from the studies.

(2) Analyzes the data thus obtained and prepares in the form of tables, charts, curves, etc., information requested by the Toll Compensation and Settlements Committee for use in negotiations with the Bell System.

(3) Makes studies of extended area service and other special service problems including private line, foreign exchange, teletypewriter, mobile and related services.

(4) Handles correspondence with Independent telephone companies relating to toll compensation matters.

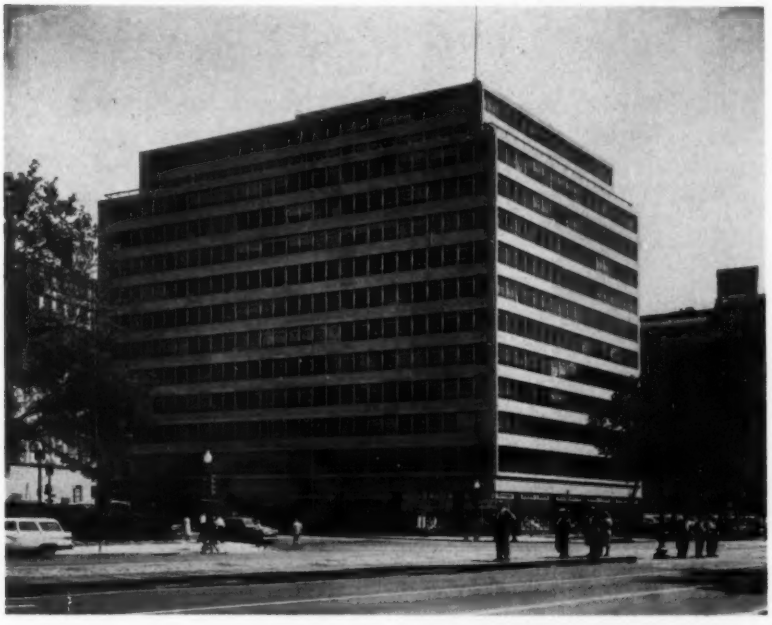
Assistant Secretary and Accountant Courtney S. Snyder. Mr. Snyder, a native Washingtonian, went with USITA in 1952. He previously had extensive accounting practice with several large industrial firms. His duties consist of:

(1) Preparing annual statistical volumes, including preparation of report forms, checking returns from reporting companies, assembling data, and conducting correspondence with member companies.

(2) Developing data for use in preparing the association's budget.

(3) Supervising operation of the bookkeeping department and preparing tax returns and other tax forms.

(4) Assisting on special assignments, including liaison with government



The USITA has its headquarters office in the Pennsylvania Building (above), Pennsylvania Avenue, 13th and E Streets, N.W., in the nation's capital. Directly across the avenue is the Post Office Department building, in which the Federal Communications Commission has its headquarters.

agencies on accounting and allied matters.

(5) Preparing special statistics as required.

Activities on Radio

Radio Engineer Thomas Warner. Mr. Warner served in the Communications Division of the Michigan State Police from 1935 through 1940. From 1940 through 1945, during World War II, he was assigned to the Communications Department of the Cavalry School at Fort Riley, Kan., serving in turn as instructor in radio theory, director of training, executive officer, and from 1944 through 1945, lieutenant colonel and chief of the department. He was recalled to active duty during the Korean war (1951-1952) as plans and training officer of the Signal Corps Replacement Center at Ft. Gordon, Ga. From 1945 through 1957, he was employed by the Greyhound Corp. as director of communications. He joined USITA on January 1, 1958.

The principal duties of the Radio Engineer are as follows:

(1) To keep abreast of technological developments in the application of radio to the field of telephony and of changes in applicable rules and regulations of the Federal Communications Commission.

(2) To keep the engineering subcommittee on radio and carrier advised of such developments and changes.

(3) To testify for the association at hearings before the Federal Communications Commission in radio and television proceedings affecting the interests of Independent companies.

It is also the responsibility of the Radio Engineer to:

(1) Keep Independent telephone companies advised by correspondence, member letter items, and by other means, of technological developments and of changes in FCC rules and regulations.

(2) Seek by correspondence, member letter items, and other means, to encourage Independent telephone companies to utilize radio in their operations.

(3) Seek to expedite, when called upon to do so, the processing of Independent telephone company applications to the FCC for radio authorizations.

Because of the large number of companies in the Independent industry, the Radio Engineer must necessarily devote attention to the general problems of the industry. He shall not be expected to deal with the general problems of individual companies except as they may be incidental to the primary responsibilities.

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H. A. Barnhart, *President*

F. B. McHenry, *Vice President*

C. C. Pearce, *Vice President*

Kelley McNish, *Vice President*

C. D. Brorein, *Treasurer*

Officers of the United States Independent Telephone Association, who, with Executive Vice President Clyde S. Bailey and Secretary George C. Richert have successfully directed the affairs and activities of the association during the past year.

You, Too, can be a Member of USITA

*By LEON F. ROBERTS**

—*a symbol of prestige*

ON SUNDAY, Oct. 11, there will be assembled in Chicago's huge Conrad Hilton Hotel some 3,000 men and women who work in the ranks of Independent telephony. They will include company presidents, vice presidents, managers, department heads, chief operators and other key people representing large, small and medium-sized telephone companies from 50 states and Puerto Rico.

For the best part of four days they will break bread, rub shoulders, exchange ideas, listen to informative, educational and entertaining speeches by nationally prominent men, as well as recognized leaders of the industry, gaze with awe and delight upon room after room of the newest examples of telephone equipment, and then return to their homes—refreshed, invigorated, and better equipped to meet the challenges of their common operating problems.

Will you be there?

If you are a member of the United States Independent Telephone Association, you previously have received our advance information telling all about the convention program. If your company is not affiliated with the national voice of the Independent branch of the industry, we want to extend to you now an invitation to join this great outpouring of telephone people. We also want to extend to you a cordial invitation to join the hundreds of other telephone companies which are members of USITA in good standing.

Occasionally, we in the Washington headquarters are asked by a company president or manager: "Why should a small company like ours be a member of the USITA?"

Well, those who are, and who have been, members for any length of time can come up with many answers to that question. I will attempt to point up just a few.

In the first place, there is not an Independent telephone company in the land, large, medium or small, that has not benefitted very measurably and considerably in the activities of our association down through the years of its illustrious existence, and they will continue to benefit in future years.

It is our belief that the majority of non-member companies, if properly informed and approached, would prefer not to continue their "free ride" but would like to become full-fledged members. We hope this article in TELEPHONY will be considered an earnest invitation to do so.

It must be quite generally known that the association, among other things, through its full-time toll engineer and designated committees, spends a great deal of time and lots of money in studying toll compensation problems and negotiating with the Bell System for increased compensation to Independent companies on interchanged business. Since 1936, toll compensation payments to the Independents have grown from 12 million dollars to more than 200 million dollars annually at the present time. A very substantial portion of this increase is directly attributable to the association's efforts. It must be generally known, too, that we are currently seeking to bring about still more adequate compensation to Independent companies. These efforts are expected to add up to substantially increased revenues for the majority of Independent telephone companies.

Another activity of the United States Independent Telephone Association, which has meant dollars and cents in the cash register, has been that of the 750-station switchboard operator exemption under the Minimum Wage Act. It was the USITA which obtained this protection, chiefly in the interests of the smaller companies, and which has battled for its retention down through the years. Repeal of this exemption would have jeopardized the very existence of many small Independent telephone companies. Its repeal also would have been harmful to the small units of some of the larger multi-exchange operations. The association has strongly guarded this exemption in the face of strong opposition, and no one will dispute the fact that it has saved hundreds of thousands of dollars for the operating companies of the Independent telephone industry.

Writing in this magazine not so long

* Mr. Roberts is director of Information of the United States Independent Telephone Association.

L. F. ROBERTS

ago, Francis X. Welch, Washington editor of TELEPHONY, said:

"Anyone at all familiar with the history of this legislation knows that had it not been for the vigilance of the United States Independent Telephone Association, this exemption would have been wiped off the statute books long before this. The association still is standing like Horatius as the bridge in defense of this provision of the Wage-Hour Act."

Toll compensation and the switchboard operator exemption are only two of many activities which have benefitted our companies, directly or indirectly, but space does not permit a recount of them all. Suffice it to say that our officers, directors and committees are on the firing line every day, fighting for and protecting the interests of all Independent companies everywhere. It also goes without saying, I think, that we shall continue to do everything in our power to see to it that the Independents are accorded their rightful place in the sun as one of the country's outstanding enterprises and as a substantial facet of the American economy.

Clive W. Haas, the enterprising owner and manager of the Big Timber (Mont.) Home Telephone Co. (1,100 stations), and former president of the USITA, has this to say:

"The Independent telephone industry stands on the threshhold of a new era which seems destined to transcend all others. How far we move and how rapidly depends *on all of us* and how well we explore the *acres of ideas* around us. Our future sets up a big target to shoot at, *posing many problems.*

"For a successful performance of the gigantic task ahead, we shall need counsel and guidance as never before. Our national organization, the United States Independent Telephone Association, can be depended upon to smooth the way and help us as time goes on. From its vantage point in the nation's capital, the association will continue to give grand emphasis to the 'forward look.'"

"Prestige of Belonging"

Does anyone know of any company that could not profitably use the guidance, counsel, and assistance of the national trade organization of the Independent telephone industry? If yours is a non-member company, would you not like to explore with us the "acres of ideas" that we will be rounding up and passing on to our members? You can enjoy "the pride of belonging" and reap a variety of practical benefits by affiliating with the association without further delay.

Frequently, we in the Washington office get letters that speak more eloquently than can I regarding the values received and the prestige of belonging to the national association. Such a testimonial came in just last month from L. A. Guest, manager of the Central Oklahoma Telephone Co. of Davenport, Okla. After informing us that the REA financed companies in that area had adapted USITA's official emblem to their uses for display on trucks, in their offices, paystations, etc., Mr. Guest said:

"As you can see, the emblem is basically the USITA emblem so that we can be identified as a part of the Independent industry. It will also take advantage of our nationwide advertising program. Since several of the other companies were not members of USITA, I took the opportunity to invite them to join. It is my sincere belief that there is strength in unity. The larger the membership of USITA, the more authority it has in speaking out for the Independent industry. Each Independent reaps untold benefits even though they are not a member.

"As you can perhaps see, I'm quite proud of my heritage as an Independent telephone man. My parents each served a lifetime in the Independent industry. I have been associated with, or active myself, in Independent telephone work for 24 of my 38 years.

"We enjoy the newsletters and other items from your office. Even though we are a very small company, we are proud of our USITA membership."

I liked this letter from Mr. Guest because it summed up very nicely the reasons why telephone companies should belong to their national Association.

The old saying that there is strength in unity is just as true now as it ever was. The more companies that affiliate with and participate in the activities of the United States Independent Telephone Association, the more effective will we be in representing the interests of the industry in the forefront of

(Please turn to page 102)

Speakers from outside of the telephone industry who will address the USITA convention are upper left, Roscoe Drummond, upper right, George Murphy, and right, Arthur "Red" Motley. Mr. Drummond is a syndicated columnist and Washington bureau chief of the New York *Herald Tribune*, and Mr. Murphy is a stage and screen star as well as being known as a motion picture industry public relations man and vice president of Desilu Productions. Mr. Motley is the publisher of *Parade*, the Sunday newspaper magazine.

Visiting the Manufacturers' Displays

A self-avowed innocent in the technical realm, sees unparalleled benefits for other laymen in visiting manufacturers' display rooms at the 62nd annual USITA convention.

By FRANCIS X. WELCH, Washington Editor
and Editor, Public Utilities Fortnightly

LAST year at the 61st annual convention of the United States Independent Telephone Association in Chicago, this writer found himself suddenly and entirely unexpectedly as surprised and fascinated as Alice in Wonderland. He had gone down to the fifth floor of the Conrad Hilton Hotel in search of something entirely different; namely, a large, nervous, pink-nosed white rabbit by the name of Pete Reno. This Pete Reno, as readers may be well aware, is constantly glaring at his wrist watch, uttering cries of dismay, and then dashing off in all directions at the same time. He is a hard fellow to catch.

But, this time Pete did your correspondent a favor, unknowingly of course, by creating an opportunity to look at all the manufacturers' exhibits. True, this writer had previously been exposed to the technical wonders of telephony. Like most laymen—which is to say, people engaged in the non-technical end of the business—he has usually watched these things abstractly, or with mild interest, as you would look at somebody else's baby behind the viewing glass of a maternity hospital.

Too often that is the typical attitude of our non-technical people. And, let it be said, right off, that if you were rating non-technical people on the basis of *being* non-technical, your correspondent yields to no one. Here is a man who can plunge half a peaceful rural Maryland community in utter darkness by simply trying to change an electric light fuse. There is not a bit of truth, however, to the exaggerated rumor (circulated, I suspect, by Ray Blain) that the Baltimore Gas & Electric Co. pays Welch a small bribe each month to stay out of his own basement.

Seriously, non-technical people would all be much better non-technical people, in their own lines of telephone business operations, if they went oftener and stayed longer at these marvelous demonstrations of research and development which are so conveniently available to every one of the thousands who attend the USITA conventions. They are convenient primarily because of their very concentration within the easily accessible space of two floors of the same hotel in which the convention is held.

Unsung Hero—the Exhibitor!

Where else on earth would you find, within walking distance comparable in area with an ordinary football field, up-to-the-minute model demonstrations of equipment, ranging alphabetically from the latest "automatic dial" and switchboard to "wiring" of all types, sizes, and specifications. More than that, these exhibitors maintain the very best informed experts to stand by long hours for the express purpose of demonstrating and answering questions, dispensing exploratory literature, and otherwise loading the visiting conventioneer with all the technical "know-how" he can possibly carry home with him—either in his suitcase or between his ears.

These are truly the unsung heroes of many an USITA convention, not only because of the exhibitors support (without which these conventions could not possibly be so successful), but mainly because of the tremendous amount of positive help which they give to the visitors to their showrooms. This is necessarily one of those intangible, unheralded, and unadvertised benefits, the extra dividend, that you get when you go to a convention. These polite ambassadors of good-will for the manufacturing industry do not realize themselves how much assistance they give to so many people through their patient hours of "keeping store."

Several years ago a busy Independent telephone company official told this writer, on a plane trip back from Chicago, that he had been sold on a new type of telephone booth by simply looking at it for a few seconds. Not a word was spoken. Probably the display manager in charge was not even aware of his visitor's presence. "But it suddenly flashed in my mind," said this telephone official, "that this is what Fred (our commercial manager) had been trying to talk to me about for the past six months; and I just hadn't been able to visualize the thing." The background of this official had been accounting; and he had naturally been more preoccupied with revenue requirements, finance and rate structure than the latest refinements in telephone booth construction. As soon as he saw it, and saw what it could do, he went home and approved it.

All of us at some time or another have been in this same boat. With the passing years we tend to become more and more withdrawn and isolated within the watertight compartment of our

own specialty—taking for granted or hearsay, what is going on in the back rooms of our own office buildings.

Opportunity At Chicago!

The annual display of equipment at Chicago can easily and quickly put an end to such apathy, if not ignorance. Non-technical telephone people would be well advised to make a promise to themselves that they will visit each and every showroom during the forthcoming USITA convention on Oct. 11-14. And, since every piece of equipment on display is indispensable, to some extent, to the successful rendition of telephone service, each item is worthy of some attention, no matter how humble its function might be—whether it be a specialized screwdriver or some other hand tool or buried hardware, even paints, preservatives and weed killers.

This much is certain: If the exhibitor has such confidence in his product that he has invested the necessary wherewithal to bring it to our attention in company with an all-star array of other equipment by other nationally known and advertised exhibitors, you may rest assured that it *is* well worth your attention, indeed! Hardheaded businessmen do not spend that kind of money on idle gestures. In other words, there is real gold up there on those display floors for you, if you want to dig for it. And, you don't have to dig hard.

Exhibits For All Personnel

One of the fallacies which ought to be dispelled about convention displays —and it was dispelled for this writer very eloquently by a super salesman last year for an exhibitor, which must be nameless — is the weird notion that these displays are only there for inspection by technical operating people. That is all wrong. And the exhibitors, without exception, will be glad to assure you that such is not the case. Too often a telephone man or woman with a strictly office job, quite remote from physical operation, will say "This is not for me. I do not buy, order, or use equipment for my company, nor is my advice asked about it." That is no excuse for not *knowing* about it.

It is the mark of a progressive telephone man or woman in any phase of the business not only to know all about everything he or she can understand in connection with the business, but also to keep up with the latest improvements and developments. No telephone employe or official can honestly say he is as well informed as he might be, about his own business if he follows any other course. The trouble is most of these non-technical people do not ordinarily have access to physical inspection and demonstration of various types of equipment. They do not get to read technical journals. And, their contacts with operating people in their own company are naturally confined to casual hearsay about the equipment already in use. So what chance *do* they have to find out about such things—in a way which they can readily understand? The answer is perfect: The USITA convention at Chicago.

The telephone man or woman who wants to get ahead in the business would do well to look around and use some imagination about what makes it run. How, for example, is a telephone directory put together? How is it printed? And why is the Yellow Section yellow, and not some other color? Is your company's directory the best answer to its present directory needs? You might step out into your own office and look around at some of the automatic equipment—the computers, the toll recorders, the visible indexing, filing, and billing operation. And, then you could step out into your switchboard room and really get lost in the maze of exchange for outside plant installation and maintenance—right down to the telephone on the subscriber's premises.

What's New In the World

After that there are a host of ancillary operations. The new and thrilling appliances for both general and specialized use. Mobile radio-telephone, repair and maintenance trucks, trenches and diggers, and particular tools and supplies already mentioned. Are you persisting in living in a world all of your own, even if it is behind the times? If you are, how can you tell if your company is not? Maybe there is an old man (or a young man) sound asleep up in your company's front office, who will stay asleep until somebody wakes him up and tells him what is new in the world.

Such curiosity is not going to be resented by anybody. On the contrary. Maybe the boss is sending you to the USITA convention because he is too busy or tied down to come himself. And maybe (without saying so or even realizing it, himself) he is hoping that you will be able to bring back from Chicago some new ideas or suggestions. Or if he has not thought about that in so many words, he might welcome the suggestions just the same.

There has been many a high-priced electric business machine sold on the suggestion of an office worker who saw one or was able to use one. So, at Chicago, here are the office workers and the other workers in every phase of telephone operation with a unique chance to see for themselves what goes on. Perhaps it is the only chance they get from one year to the other—outside of their own plant, which they have already seen many times.

The dynamic postwar growth of the telephone industry is another reason why every one in it, in any capacity, has a duty to be concerned about it. Since the end of World War II the number of telephones has doubled from a little more than 34 million in 1947 to more than 67 million today. During that same period the number of automobiles on American streets and highways have increased in about the same proportion, or maybe a little more. But, what a difference there is in the public service obligation involved in the telephone industry as compared with the automotive industry. When you put a new automobile on the road it merely means selling another unit from the same production line. The models change and improve, of course, from year to year. But, once they are produced, each unit is independent of the other (barring a collision).

More Than Wire Needed

In the telephone business, on the other hand, every new telephone station added *increases the overall burden of operating requirements with respect to all telephones in use to some extent!* Bringing telephone service to more customers is not simply a matter of stringing more wire on more poles, or maybe adding new units to an exchange board, it means a constant review and recasting of plans and construction. And this, in turn, imposes upon everyone in the business a responsibility for seeing that he or she is as well informed as possible. Techniques and methods of

USITA ARRANGES ADVANCE REGISTRATION

In order to minimize congestion at the convention registration desk, USITA is providing for advance registration. To do this it will be necessary for each company to let USITA know whom it will send to the convention and by whom they will be accompanied. Send your list to Clyde S. Bailey, executive vice president of USITA, Suite 438 Pennsylvania Bldg., Washington 4, D. C., promptly.

The association will prepare registration cards and name plates for badges in its Washington office. When you register for the convention, you may go to the proper alphabetical section of the registration desk in the Astoria Room, Conrad Hilton Hotel, and ask for your badge.

operation are changing constantly. And what was the latest word a few years ago may be old hat today, and obsolescent tomorrow.

The "Wonderland" at Chicago

The only way—the only possible way—to keep up with this interminable march of progress, from the production line to the junk pile, is to maintain constant vigilance at all possible vantage posts of new ideas and new products. An uncomparable vantage post, therefore, is the annual collection of exhibits at the USITA convention in the Conrad Hilton—costs no more than a trip on the hotel elevator for a pleasant hour or two, checking from one room to the other. It will be pleasant because it will be new. It will bring challenging ideas never before suspected, much less inspected. Such a trip might be worth hundreds or thousands of dollars to you, through a single inspiration. You never know. It has all happened before, often.

The reader need only compare modern telephone service today with what it was at the end of World War II, to get an imaginative jolt about what it is going to be 10 years from now—at the present rate of phenomenal growth and plant expansion. During that postwar period, dial conversion has become an accomplished fact for practically all segments of the industry. The transistor, the coaxial cable, mobile telephones have all made their appearance. Direct Distance Dialing, already in operation in many places, is knocking on the door and demanding admittance all over the rest of the country as soon as it can be accommodated. Are all Independents ready for it when it

(Please turn to page 142)

W. H. Todd, *Accounting*

K. L. Lawson, *Commercial*

Paul Henson, *Engineering*

M. S. Bodine, *Plant*

W. G. Winters, *REA Borrowers*

D. A. Perigo, *Traffic*

Chairmen of the departmental conferences to be held during the USITA convention — Accounting, Commercial, Engineering, Plant, REA Borrowers and Traffic. These conferences are important features of the Independent convention as they provide convention-goers a good opportunity to hear about new developments and techniques in those fields, and to find solutions to problems arising in day-to-day operations. See *The Plant Man's Notebook* for a resumé of subjects to be discussed at the conferences.

Program for 62nd Annual Convention

United States Independent Telephone Association

CONRAD HILTON HOTEL, CHICAGO

SUNDAY, OCTOBER 11

10 A.M.—REGISTRATION—Astoria Room (Third Floor)

2 P.M.—REA BORROWERS CONFERENCE—Parlor B, Williford Room. W. G. WINTERS, *Presiding.* GREETINGS FROM THE USITA, HUGH A. BARNHART, President; REPORT OF REA BORROWERS COMMITTEE, W. G. WINTERS, *Chairman;* HOW LARGE COMPANIES CAN FINANCE THEIR RURAL DEVELOPMENT THROUGH THE REA, E. C. GATES; STATUS OF THE REA TELEPHONE PROGRAM, D. A. HAMIL, Administrator, Rural Electrification Administration.

MONDAY, OCTOBER 12

10 A.M.—ACCOUNTING CONFERENCE—Lower Tower. W. H. TODD, *Presiding.* GREETINGS FROM THE USITA, FOSTER B. MCHENRY, Vice President; REPORT OF ACCOUNTING COMMITTEE, W. H. TODD, *Chairman;* BUDGET RESPONSIBILITIES OF ALL MANAGEMENT LEVELS, WALTER G. WRIGHT; ADEQUATE AUDIT TRIALS IN MECHANIZED ACCOUNTING, BRUCE P. OLSEN, Ernst & Ernst; RATE PREPARATION AND PROPER PRESENTATION AS IT RELATES TO THE ACCOUNTING DEPARTMENT, EDWARD J. KNAUB, Ohio Public Utilities Commission.

10 A.M.—COMMERCIAL CONFERENCE—Beverly Room. KENNETH L. LAWSON, *Presiding.* GREETINGS FROM THE USITA, C. C. PEARCE, Vice President; REPORT OF COMMERCIAL COMMITTEE, KENNETH L. LAWSON, *Chairman;* MARKETING AS A PUBLIC RELATIONS TOOL, ALLAN R. STACEY; SOME COMMERCIAL ASPECTS OF AUTOMATION, E. H. UTZMAN; A DIRECTORY OF THE FUTURE—Panel Discussion by Representatives of Directory Publishing Firms. MODERATOR—LaMar S. Stoops.

10 A.M.—ENGINEERING CONFERENCE—Waldorf Room. PAUL H. HENSON, *Presiding.* GREETINGS FROM THE USITA, HUGH A. BARNHART, President; REPORT OF ENGINEERING COMMITTEE, PAUL H. HENSON, *Chairman;* TRANSMISSION AND COMMUNICATION IMPROVEMENT, FRANK S. BARNES JR.; CHICKENS AND EGGS, FRANK A. MORRIS; NUMBER SERVICES ASPECTS IN DDD, R. A. MATHEWS, American Telephone & Telegraph Co.; COMMUNICATIONS FOR NORTH AMERICAN AIR DEFENSE, COL. HOWARD S. GEE, United States Air Force.

2 P.M.—GENERAL SESSION—Williford Room. CALL TO ORDER, CLYDE S. BAILEY, USITA Executive Vice President; INDEPENDENT TELEPHONY'S FINEST HOUR, HUGH A. BARNHART, USITA President; REPORT OF THE TREASURER, CARL D. BROREIN; THE STATE OF THE UNION, ROSCOE DRUMMOND, Head of Washington Bureau, New York *Herald Tribune.*

TUESDAY, OCTOBER 13

10 A.M.—PLANT CONFERENCE—Waldorf Room. M. STAPLETON BODINE, *Presiding.* GREETINGS FROM THE USITA, FOSTER B. MCHENRY, Vice President; REPORT OF THE PLANT COMMITTEE, M. STAPLETON BODINE, *Chairman;* CABLE PRESSURIZATION METHODS, L. W. ROBELLO; MANAGEMENT'S RESPONSIBILITY FOR SAFETY, RALPH I. CROSBY, Marsh & McLennan, Inc.; CARRIER MAINTENANCE AND TEST GEAR, PAUL MURPHY.

10 A.M.—TRAFFIC CONFERENCE—Beverly Room. D. A. PERIGO, *Presiding.* GREETINGS FROM THE USITA, C. C. PEARCE, Vice President; REPORT OF THE TRAFFIC COMMITTEE, D. A. PERIGO, *Chairman;* THE WHAT, WHY AND HOW OF TRAFFIC ENGINEERING, DON CHILDERS; PLANNED DEVELOPMENT FOR PROFITABLE MANAGEMENT, F. W. HAMPER; TRAFFIC ECONOMICS, L. GRAY BECK; THE TRAFFIC DEPARTMENT AND CUSTOMER RELATIONS, WILSON GARNETT.

2 P.M.—INDEPENDENT TELEPHONE PIONEER ASSOCIATION—Grand Ballroom. WILLIAM F. MILLER, ITPA President, *Presiding.* BUSINESS SESSION, Report of Executive Secretary and Treasurer Mayme Workman; ENTERTAINMENT, Illinois Bell Chorus.

WEDNESDAY, OCTOBER 14

10 A.M.—GENERAL SESSION—Williford Room. President Hugh A. Barnhart, *Presiding.* OUR "SENIOR" PARTNERS, ARTHUR H. MOTLEY, President, Parade Publications Inc., New York, N. Y.; BE ENLIGHTENED—BEWARE, GEORGE MURPHY, Vice President, Desilu Productions, Hollywood, Cal.

MACHINE READS TYPEWRITTEN PAGES

THE United States Air Force Air Research and Development Company recently announced the successful development of a new information machine which reads typewritten pages and translates them into electrical signals at the rate of 200 characters per second. The new machine, the first of its kind, was developed by the Intelligent Machines Research Division of Farrington Mfg. Co., Arlington, Va., and called the Print Reader MX-2021.

The Print Reader is the result of a two-year development program by United States Air Force Scientists at the Intelligence Laboratory, Rome Air Development Center, Griffiss Air Force Base, New York, and expert pattern recognition scientists at Intelligent Machines Research of Farrington.

Successful achievement of automatic reading of printed information is based in part on basic techniques used in Farrington's 25 print reading machines being used at various commercial installations.

However, the Air Force machine is far more advanced than any existing commercial installation in that it reads ordinary typewritten sheets having both upper- and lower-case alphabetical characters; numerals which are self-checking for accuracy; and even reads the punctuation symbols.

As it scans a line at a time, it reads the information one character at a time, and upon identification, using stored electronic logic, it instantaneously converts the information into electrical signals. It thereby provides the Air Force with information in a form which avoids all subsequent manual handling in communications, indexing, abstracting, and other information-processing problems necessary to the Air Force and other government agencies.

The Air Force interest in the Print Reader centers upon a never ending maintenance of millions of pages of information which must be processed before being used. All technical information must be indexed and abstracted so scientists will know the information exists and how to locate the information when they need it.

While machines already have been used to translate, index, abstract and retrieve information, the original data have always been entered manually by keyboard operators. Now, the Print Reader performs this heretofore tedious operation almost instantaneously and accurately, and relieves manpower for more important tasks required in information data-handling within the Air Force. With only 30 of these machines, it is possible to automatically read and process information at a rate of 10 million pages a year.

STEPPING TRANSISTOR

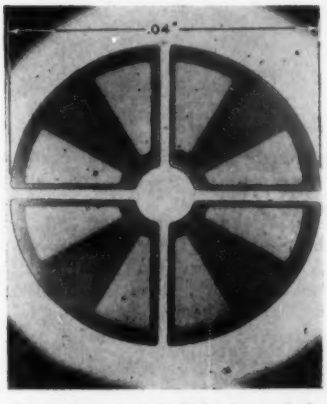
A P-N-P-N semiconductor element that can serve as the basic building block of a silicon stepping transistor has been described by Bell Labs. It has potential application to digital computers, push-button dialing, and telephone switching. (See cut.)

The four-terminal device acts as a pulse-controlled on-off switch. It may be used as a basic stage in building up certain logic circuits in digital computers, such as for counting and decoding. By using one element to drive two others, versatile decoders can be made.

A more complex device, which is fabricated from a single piece of silicon, can also perform these logic functions. As a proto type arrangement, a stepping transistor with four stages—or elements—has been made.

The stepping transistor, as fabricated on a single piece of silicon, performs the function of a complex circuit. Hence it is referred to as a "functional device." The concept of a functional semiconductor device is a promising approach to microminiaturization.

The stepping transistor, itself, is



Top view of Bell Telephone Laboratories' stepping transistor structure, as fabricated on a single piece of silicon by oxide masking diffusion techniques. Actual diameter of the device is 40-thousandths of an inch; in the photo it is magnified. Light and dark areas show the different electrically-active regions of the stepping transistor structure. Lead wires are attached to the pie-shaped areas.

the result of work originated in 1954 by I. M. Ross of the laboratories. His object was to build a semiconductor device that would function similarly to a gas stepping tube—a digital counter capable of carrying out at high speeds many of the same functions usually performed by complex circuitry or else at low speeds only by chains of relays and mechanical stepping switches.

The gas stepping tube utilizes the bistable voltage-current characteristic of a gas discharge for its operation. Unidirectional transfer of voltage between its electrodes — one anode and several cathodes—is obtained by the nonsymmetrical geometry of the latter's construction.

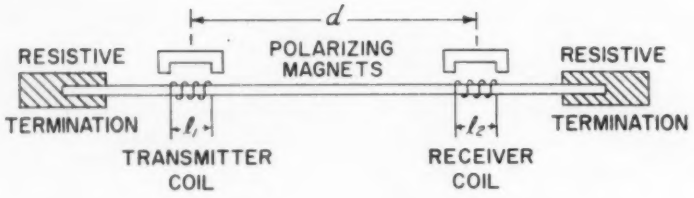
The stepping transistor utilizes a p-n-p-n transistor as the bistable element. The design of the structure results in a bistable voltage-current characteristic between a single common electrode and a set of multiple electrodes. Non-symmetrical geometry is employed to obtain an unidirectional transfer of voltage.

ANTENNA INSTALLATION

IF YOU have an antenna to install and you'd like to know more about the subject, write to Scala Radio Co., 2814 19th St., San Francisco, Cal., and ask for their reprint on "Commercial Antenna Installation."

HEARING AID

A NEW idea in hearing aids has been proposed in the IRE Transactions on Medical Electronics. The scheme is to glue a tiny permanent magnet to the patient's eardrum. This could be excited into motion by an external coil which would carry the speech to be heard. Advantages include no acoustic feedback and no necessity for molded pieces to tightly fit the ear canal.



BASIC MAGNETOSTRICTIVE DELAY LINE

MAGNETOSTRICTION

WHEN a piece of magnetic material is subjected to a magnetic field, the dimensions of the magnetic material change slightly. Thus, a rod or tube passing through a coil, will get longer or shorter by a tiny amount if a magnetic field is produced by the coil. This effect is known as "magnetostriction," and has been used to generate ultrasonic vibrations. This is possible because the magnetic material can be made to shorten and lengthen at a rate faster than an ordinary loud speaker can vibrate, thus it can reproduce higher frequencies.

Such a vibrating rod, in addition to serving as reproducer, can also become the heart of the oscillator which generates the high frequency. In this application, two coils are used, one of which becomes energized, stressing the rod, causing a voltage spurt in the second coil a fraction of a second later. This voltage, if fed back into the circuit, sustains oscillations at a frequency determined by how long it takes the stress to travel along the rod from one coil to the other.

Now ITT Laboratories have turned this principle into a magnet-ostrictive delay line, which will introduce delays into an electrical circuit, when such delays are needed. Typical applications include aerial navigation devices, digital computers, radar and radar simulators.

The accompanying illustration shows a typical hookup. The pulse is sent into the transmitter coil, and picked up by the receiver coil after a short delay. The length of the delay is determined by the distance between the two coils, divided by the velocity of sound in the metal tube or rod. In this case, nickel was used, which transmits sound with a velocity of 5×10^5 cm/sec.

NON-HOWLING SPEAKER

THE distracting howl of indoor public address systems caused by acoustic feedback of room reverberations can now be avoided without paying a high price in gain.

A new electronic method developed at Bell Telephone Laboratories minimizes howling, or "singing." In fact, it permits a two-fold increase in the loudness of a conventional public address system without incurring instability.

Alternatively, for the same loudness, the new method offers a three to four-fold safety margin against accidental variations in the amplification. These unpredictable variations in amplification — caused by heating up of amplifiers, different positions of the speaker or enter-

tainer, and changes in the listening audience—are responsible for instability in public address systems.

This new method of countering distracting and exaggerated room reverberations is the work of Manfred R. Schroeder, who directs acoustics research at Bell Telephone Laboratories. In 1954, he formulated a theory of response fluctuations inside a room, which forms the basis of his invention. Dr. Schroeder's discovery resulted from studies in acoustics.

Key to the present development is a constant-frequency shift device, called a frequency shift modulator. It is inserted into the circuit between the microphone and the loudspeaker. When the input signal's frequency shift is made equal to the mean distance between the major peaks and adjacent valleys of the room's gain response characteristic, energy generated at the gain peaks is quickly absorbed in the valleys of the response characteristic after one trip of the sound energy around the acoustic feedback loop.

TEACHING TEACHERS

CLOSED circuit television, according to RCA, is now being used to teach teachers. The University of Michigan is using TV to train language teachers.

It works this way: An experienced teacher conducts a class in the English language for foreign students. While the training is going on, a TV camera takes in the whole proceedings and transmits it to another room where the student teachers are watching.

Thus these would-be teachers gain the advantage of being in the class and seeing the way an experienced instructor handles the job, yet these trainees can have all of the open discussion they want without interrupting the actual class.

COMPUTERS TAKE CUE FROM TELEPHONE

WHEN computing gets to the point where service is available on a basis somewhat resembling the telephone, then and only then will we be getting the most out of the modern computer, says Dr. R. W. Hamming, a perceptive researcher with Bell Telephone Laboratories' numerical analysis digital process group.

He suggests multiple use of the computer's storage capacity, or memory, simultaneously for many different problems.

Dr. Hamming, who did pioneering work in the invention of error detecting and correcting codes for computers, is president of the Association for Computing Machinery (ACM).

A computing system making multiple use of a computer's storage capacity may one day be placed in operation at the Laboratories, Dr. Hamming suggests. With the present computer, most technical problems require only a small fraction of its highly-expensive storage, but a few require all of it.

The storage, or memory, is that part of the machine that stores data, instructions, and other units of digital information. In the Laboratories' present computer installation, the central magnetic storage unit contains about one million magnetic cores capable of storing 32,768 numbers or instructions, to which the computer can gain access in 12 millionths of a second.

To make better use of the costly storage—that is, to utilize it to its fullest capacity—in future computing installations at the Laboratories, Dr. Hamming envisions a single centralized storage unit within reach of several different computers working independently. In turn, the computers could be reached by perhaps a hundred remote stations scattered throughout the Laboratories, each containing input and output equipment.

Input equipment might comprise several typewriters utilizing paper that records magnetic impulses, as well as typed letters, with which the scientists and engineers send instructions to the computer.

Computers are old stuff to telephone men. In 1938, Dr. George R. Stibitz developed a simple relay computer utilizing components designed for telephone systems. It was the first automatic digital computing system of any pretensions ever built.

ELECTRONIC FILE CLERK

AGREEMENTS to manufacture and market a new electronic system for automated data retrieval were announced by General Precision Laboratory Inc. of Pleasantville, N. Y., and The Filmsort Co. of Pearl River, N. Y.

Developed by GPL, the system operates within seconds after dialing a code number on a telephone-type device to select one file card out of thousands or millions. The automatic equipment can be activated by punched cards, or punched or magnetic tape, as well as by electronic dialing.

According to GPL and Filmsort, the system provides industry, financial institutions and the government with a completely mechanized means of retrieving and examining filed records of all types. It will save engineering, accounting, and office personnel untold hours of costly manual searching for and refiling of reports, ledger sheets, drawings, patents, and other vital documents.

To extend the capabilities of the equipment, closed-circuit television is combined with the electronic re-

trieval gear to transmit a high resolution image of the dialed record to a TV screen at the executive's desk. With this arrangement—called TELECARD—the file documents can be viewed simultaneously by any number of persons at various locations nearby or remote from the files.

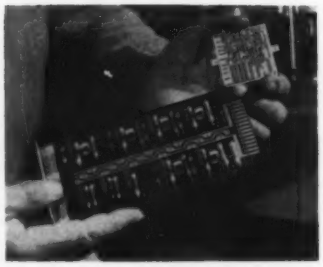
"SPUTTERED" RESISTORS

SPUTTERED thin-film resistors, formed from refractory metals such as tantalum and titanium, may be one of the more important developments in micro-miniature electronics. Such resistors can be produced on glass or ceramic bases in lines as narrow as 1 mil (0.001 inch), spaced 1 mil apart, thus producing extremely high resistance in a small area, according to a paper presented by D. A. McLean of Bell Telephone Laboratories to the Western Electronics Conference last month.

Research in sputtering, an old technique in which ionized gas molecules bombard a cathode, dislodging atoms of metal which then redeposit on nearby surfaces, has been conducted at Bell Laboratories for several years. Last year, R. W. Berry announced the development of sputtered tantalum capacitors with capacitances up to 100,000 micromicrofarads per square centimeter. The feasibility of thin film sputtered resistors was also announced at that time by H. Basseches.

The newly announced miniature resistors owe their success to a high precision masking process, which makes it possible to produce the thin films in specifically restricted locations. An expendable copper mask is used for this operation.

In producing a resistor, an overall thin film of copper is first deposited onto the ceramic or glass base, for example, by sputtering.



The printed circuit board, once the ultimate in miniaturization, can be made even smaller by the sputtering technique. The small card contains sputtered capacitors and connecting leads, as well as the resistors, thus incorporating all the components appearing on the conventional board except the diodes, which can be attached by dip-soldering.

Then, the desired pattern is etched into the copper surface by standard photoetching techniques, leaving the bare substrate exposed. Tantalum, other refractory metals, or electrically useful alloys, are then deposited onto the etched copper pattern, and the whole unit placed in an etching bath. The copper with its overlay of tantalum is removed, leaving behind only the tantalum which was in direct contact with the bare surface. Since the masks are extremely thin, fine detail is possible. Also, since the sputtered materials adhere to the substrate itself, support considerations are not necessary and complex patterns can be produced.

DATA TRANSMISSION

DATA transmission over telephone facilities in the form of simple digital on-off pulses is on the increase. It appears that this form of transmission will be widely used in the future.

Therefore, it becomes of great importance to offset the error-inducing effects of electrical noise. In order to use an error-correcting code it is necessary to make the digital system redundant by adding extra pulses.

Now, a new coding system adds these extra pulses in a continuous flow method rather than the batch method of previous codes. It needs much less expensive encoding and decoding equipment than did previously available codes. The code will correct bursts of errors such as might be caused by a lightning flash.

Experimental equipment has also been built for testing codes of different burst lengths and redundancies on actual telephone lines.

The principle underlying the use of this new error-catching code is described in the June 1959 Bell Laboratories *Record* article, "A Method of Correcting Errors in Data Transmission."

TRAINING AID

A NEW gadget for use as an aid in teaching electronic circuitry has been developed. It consists of a rectangular board on which are mounted several rows of a specially designed "contact cell."

The latter is made of metal eyelet and a rubber core. It will grip several wires at once and establish electrical contact.

This construction permits the purchase of electronic components in bulk quantities. They may be put in place without soldering or damaging them, and they may be easily removed and used again for other experiments.

A bulletin describing this equipment can be obtained from Plastic Associates, 185 Mountain Road, Laguna Beach, Calif. Ask for Catalog Sheet 901-B.

ANTENNA PATTERN INTEGRATOR

A NEW series of antenna pattern integrators which automatically measure the directivity of an antenna is now available.

With the new instrument, the integration can be made independently, or while the radiation pattern is being plotted.

The integral sum—a number proportional to the power radiated by the antenna under test—is read out on decimal counting units to an accuracy of at least 0.5 per cent of maximum count of single samples.

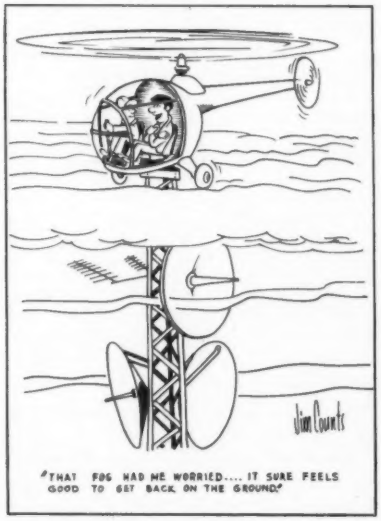
A synchro driven sampler provides 1,000 samples of the antenna signal for 360° rotation of the antenna. Automatic shut-off after 1,000 samples ensures accurate integration.

Further information can be obtained from Scientific-Atlanta, Inc., 2162 Piedmont Rd., N. E., Atlanta 9, Ga.

RUSSIAN LITERATURE

A LISTING of abstracted Russian technical journals which are currently available has just been published. The listing shows about 100 Soviet technical periodicals abstracted regularly by U.S. Government agencies and released to the public through the Office of Technical Services. The periodicals cover various fields of research including electrical and radio engineering.

You can get a copy of this listing free by writing to OTS, U.S. Department of Commerce, Washington, 25, D.C. Ask for the listing "English Abstracts of Russian Technical Journals."



"THAT FOG HAD ME WORRIED.... IT SURE FEELS GOOD TO GET BACK ON THE GROUND."

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The programs are not expensive and they carry a full refund guarantee. For the cost of a postage stamp, you can get full details. We think you will benefit greatly by sending the coupon.

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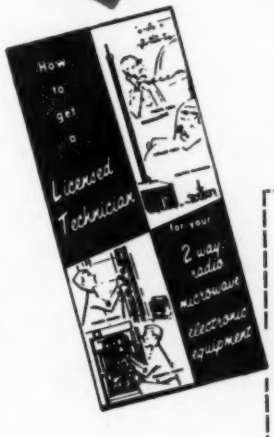

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THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

Urges delegates to USITA convention to attend departmental conferences — Accounting, Commercial, Engineering, Plant, REA and Traffic. Important feature of meeting.

TELEPHONE men and women who attend the 62nd annual convention of the USITA in Chicago this year will be well advised to take advantage of the various departmental conferences. These meetings always provide a wealth of useful information. In addition, they also offer an opportunity to ask questions and obtain valuable answers to your problems.

The first conference meeting this year is that of REA Borrowers to be held during the afternoon on Oct. 11. E. C. Gates, president of the Minnesota Telephone Co., Minneapolis, will deliver a paper titled: "How Large Companies Can Finance Their Rural Development Through REA." This is sure to prove interesting. Then David A. Hamil, administrator of the Rural Electrification Administration, will deliver a talk on the status of the REA telephone program. If you have any questions on this important subject, this conference will provide a golden opportunity to have them answered.

If you have any management, budget or accounting problems, the Accounting Conference at 10 a.m. Monday, Oct. 12, is a must. Three interesting papers will be presented. "Budget Responsibilities of All Management Levels," by Walter G. Wright, vice president-operations of General Telephone & Electronics Corp., New York City, is certain to prove of value. Then, "Adequate Audit Trials in Mechanized Accounting," by Bruce P. Olsen, assistant manager of Ernst & Ernst, Chicago Accounting firm, will answer many of your questions on this interesting subject.

Then, last but not least, is a paper by Edward J. Knaub, chief accountant of the Ohio Public Utilities Commission on "Rate Preparation and Proper Presentation as it Relates to the Accounting Department." Everyone is interested in rates and this talk will give you a wealth of necessary information.

Commercial people and managers will all want to attend the Commercial Conference also being held at 10 a.m. Monday. The opening paper, "Marketing as a Public Relations Tool," will be delivered by Allan R. Stacey, vice president of the Sunland-Tujunga Telephone Co. of Sunland, Cal. This is a subject of interest to all commercial people and we recommend that you come and hear this address and ask any questions that may be troubling you.

Next, E. H. Utzman, general commercial manager of the Southwestern States Telephone Co. of Brownwood, Tex., will discuss that important subject, "Some Commercial Aspects of Automation."

The closing feature of the Commercial Conference will be a panel discussion of representatives of member directory publishing firms on "A Directory of the Future." The moderator will be LaMar S. Stoops, vice president of the Nappanee (Ind.) Telephone Co. This feature is certain to prove interesting and we know you will want to hear it.

The Engineering Conference at 10 a.m. Monday is a must for plant men. The first paper, "Transmission and Communication Improvement," will be delivered by Frank S. Barnes Jr., of the Rock Hill (S. C.) Telephone Co. This is an important subject today and of interest to all plant men. The second paper by Frank A. Morris, of the Stromberg-Carlson Co., is entitled: "Chickens and Eggs." This is a rather unusual title, but it will have to do with telephone research and development and will give an idea of things which are to come.

Next is a paper, "Number Service Aspects in DDD," by R. A. Mathews, of the AT&T company, New York City. We are all extremely interested in DDD and this is our chance to ask questions on this very important subject.

The Engineering Conference closes with a paper by Col. Howard S. Gee, entitled "Communications for North American Air Defense." We have had a look at the communication facilities of the Headquarters, Air Defense Command at Colorado Springs, and it is certainly a most interesting system. We suggest that you make a special effort to hear this talk.

The Plant Conference at 10 a.m. Tuesday, Oct. 13, is another must for all plant men. An address, "Cable Pressurization Methods," by L. W. Robello, general plant manager of the Hawaiian Telephone Co., will explain the latest developments in this method of cable maintenance. This is a subject we are all interested in today so come and bring your questions for answers.

"Management's Responsibility for Safety," by Ralph J. Crosby, assistant vice president, Marsh & McLennan of New York City, is certain to provide useful information on the importance of safety practices.

Paul Murphy of Telephone Service, Inc., Lima, O., will deliver a paper on the subject, "Carrier Maintenance and Test Gear." The use of carrier is increasing at a rapid rate in the Independent telephone industry. This talk is certain to furnish valuable information which will prove useful in your daily work.

The Traffic Conference to be held at 10 a.m. Tuesday, will prove of special interest this year because of the ever-increasing traffic load on telephone systems everywhere. "The What, Why

and How of Traffic Engineering" is the first paper by Don Childers, of the United Telephone Co., Kansas City, Mo. "Planned Development for Profitable Management of the Traffic Department," by F. W. Hamper of the General Telephone Co. of Ohio, is certain to furnish some valuable ideas to consider.

"Traffic Economics," by L. Gray Beck of the West Coast Telephone Co., Everett, Wash., certainly should be of interest to all traffic people.

The closing paper in this conference by Wilson Garnett of the Central Telephone Co., Hickory, N. C., is titled, "The Traffic Department and Customer Relations." Customer relations is always important and you are sure to benefit from this discussion.

These conference meetings are gaining in importance each year as is indicated by the increased attendance. Not only are the talks of special interest, but the open forums at the end of each conference provide an excellent opportunity to ask questions and discuss interesting problems. These discussions always prove both interesting and instructive. It is suggested that you plan to attend as many of these sessions as possible. The questions you ask will add to the value of the meetings.

•

The development and use of power tools on construction trucks has removed much of the drudgery from line work. For example, in the old days, in order to set a pole, a man, plus a long handle shovel, a spoon and perhaps a digging bar were required to dig the hole. Then, a crew of several men, armed with pikes, was required to lift the pole and set it in the hole. Now a two-man crew and a truck equipped with an earth auger and a derrick can set a pole in much less time and with very little effort.

Power supplied by a properly equipped construction truck can now be used to advantage in the operation of electric saws, masonry drills and pole augers. The aerial lift can be utilized to place men safely in reach of their work without resorting to pole climbing.

Operating telephone companies may all be well advised to investigate the use of the latest developments in automotive equipment and power tools on their construction jobs. It may prove desirable and economical in numerous instances to reduce the manual labor effort by mechanical means.

Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

Q. Where can we obtain guide rules on the air-conditioning of a telephone exchange?

A. REA specifications provide very good general information on temperature and humidity limits that should be maintained in the exchange. Any good reputable contractor can recommend air-conditioning equipment required and furnish an estimate of its cost in place.

•

Q. What voltage is normally considered adequate for a breakdown set to be used to locate wet cable trouble?

A. Opinions differ on this subject. However, it is generally agreed that 540 volts dc will prove adequate.

•

Q. When a binding post breaks inside a terminal is there any method of making repairs without rebuilding the terminal?

A. If the trouble is due to variations in temperature causing a contraction in the binding post, this in turn resulting in a separation of the cap from the square shoulder, it is repairable.

Mercury is forced by means of an injector around the threads of broken binding posts, through terminal base plate to re-establish continuity between the cap and the square shoulder of the binding post.

A terminal repair kit can be procured that contains the mercury injector, file, bottle of mercury equipped with a dropper cap, fibre washers and complete instructions for their use.

•

Q. What is considered the most satisfactory method of training men in the maintenance of dial switching equipment?

A. We suggest that you consult the manufacturer of the dial switching equipment you now have or contemplate purchasing.

Practically all these manufacturers maintain excellent schools where men are trained in the maintenance and operation of their equipment. These schools cover training in circuits as well as actual adjustment of the equipment.

•

Q. Please tell us—will plastic-insulated and jacketed switchboard cable prove satisfactory for use in the installation of dial switching equipment?

A. This type of cable has been in use for several years and from all indications it has proved to be entirely satisfactory.

It must be remembered, however, that this is specially designed switchboard cable and that it incorporates numerous features in its design that are not found in ordinary plastic distribution cable.

•

Q. Will it be legal to install a red flashing light on our line construction and trouble trucks?

A. We suggest that you check with the proper authorities in your community before installing any type of flashing light on your vehicles.

It is understood that in certain localities this type of light is restricted to police and fire vehicles.

•

Q. Please tell us what a pressure contactor is and how it is used on a pressurized cable.

A. One such device is a pressure sensitive electro-mechanical switch for the detection of leaks in pressurized cable. It consists of a switch assembly actuated by a diaphragm so that closure is accomplished when pressure decreases below a present level.

This action shunts a resistance across a working pair which provides a signal at the central station. The diaphragm is a spring member and requires no pre-loading or back-lash spring.

Overpressure protection is provided by a unique arrangement of the switch bracket and self-locking adjustment screw with a range of 0 to 15 PSI.

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3 Smoother contouring... more adaptable for multiple guying

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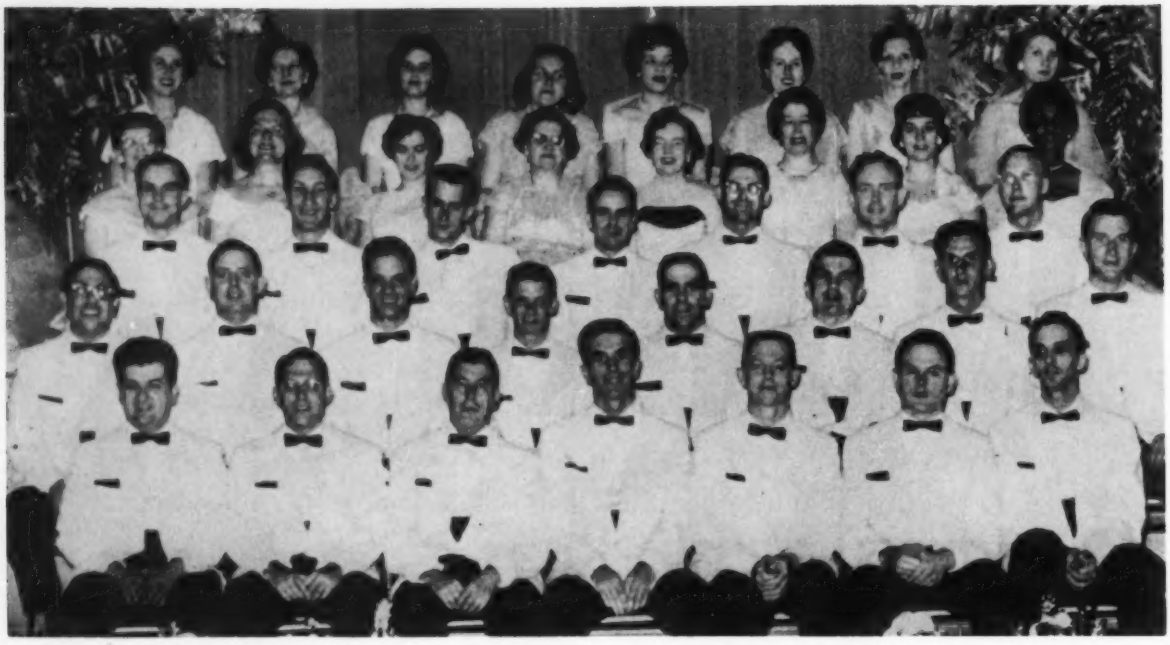


Illinois Bell chorus which will entertain Independent Pioneers and their guests during USITA convention.

Pioneers To Hear Illinois Bell Chorus

THE ANNUAL meeting of the Independent Telephone Pioneer Association (ITPA) will be held in the Conrad Hilton Hotel's Grand Ballroom, in Chicago the afternoon of Oct. 13. President William F. Miller of Des Moines, Ia., will preside.

Mayme Workman will present the executive secretary and treasurer's reports. Chairmen of the various committees will also present their reports for the association's fiscal year, ending Sept. 30.

Three new directors will be elected to replace the following directors whose terms expire in 1959: George Hamburger of Washington, D. C., Miss E. M. Hiestand of Madison, Wis., and William F. Miller.

Pioneers will also be elected to serve on the association's Advisory Committee to replace members whose terms expire in 1959.

Pioneers and their families and guests in attendance at the USITA convention are cordially invited to come and hear the Pioneer's program of entertainment to be presented by the Illinois Bell Telephone Co. Chorus. This program will be presented immediately following the association's business session. Those who heard the Illinois Bell Chorus at the Pioneer's annual meeting in 1948 know that a real treat is in store for them.

Immediately following the entertainment, the ITPA board of directors, including the newly elected directors, will hold their annual meeting, in the Pioneer headquarters room.

L. J. Rizzo of Chicago is chairman of the ITPA Annual Meeting and Entertainment Committee. Other members are John Brown Cook, Herbert F. Lello, W. J. Pfaender, all of Chicago; H. C. Ryon of Galion, O., and Berney Simner of St. Louis, Mo.

Mayme Workman, ITPA executive secretary, has issued an invitation to all members of the Pioneer association to visit its Convention headquarters in Room 535-A of the Conrad Hilton Hotel. Mrs. Workman issued the following statement,

"The 1959 biennial official Pioneer roster will be distributed in the headquarters and it will be appreciated if members will pick up their copies in order to save the cost of mailing the rosters.

"Payment of membership dues will be accepted at the headquarters, as usual. We will also be happy to enroll new members in all membership classifications: Direct, Associate, and Auxiliary. Husbands and wives of direct members are invited to join the association as auxiliary members, providing they are not qualified to become direct members; that is, if they have not been engaged in the Independent telephone industry 15 years or more.

"Men and women who started in the Independent telephone industry in 1944 are eligible to join the association this year. Why not honor yourself by becoming a member of the Independent Telephone Pioneer Association this year, an organization comprised of men and women who represent the "cream of the crop" in Independent telephone operating companies, manufacturing and supply companies, and associated interests.

"Berney Simner, chairman of the ITPA New Associate Members Committee, and A. C. Herbert, chairman of the New Members Committee, and members of their committees, have worked diligently throughout the year, and have been assisted by many members, not serving on these committees, to increase the membership of your association, and they have been most successful in their effort.

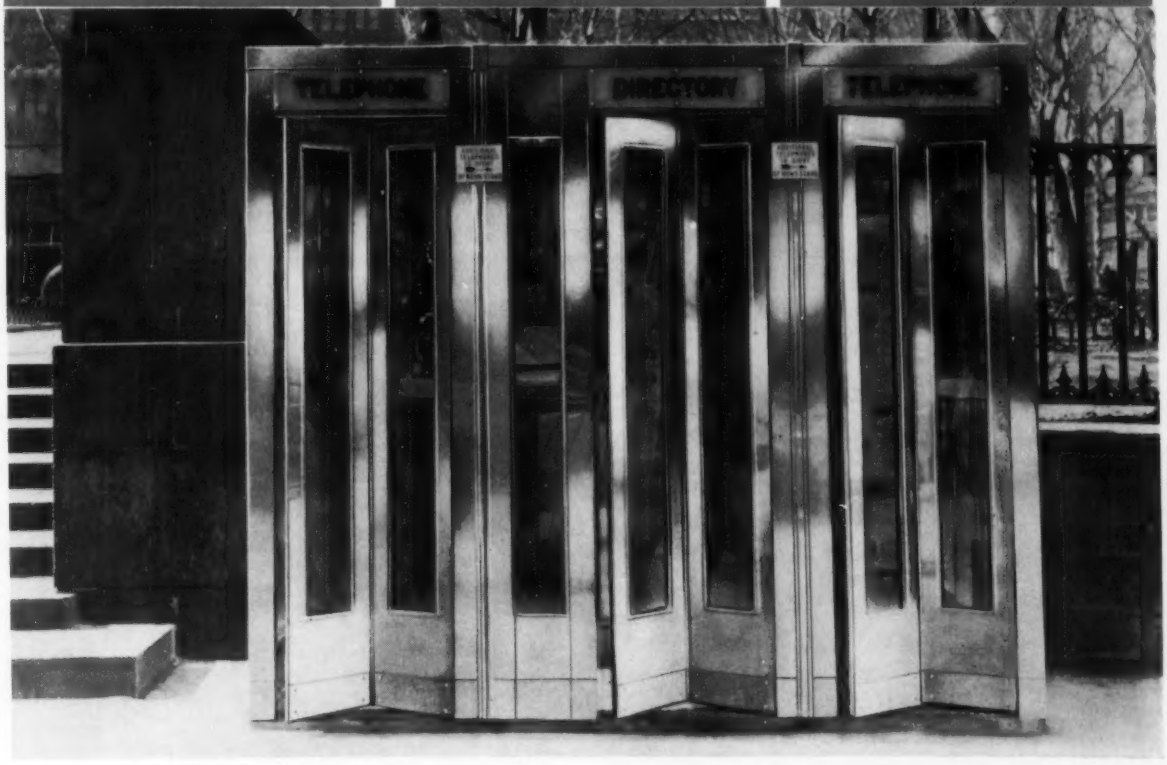
"Bring your eligible friends and coworkers to the Pioneer headquarters and the attendants at the registration desk will be happy to enroll them in the Pioneer association. An attractive souvenir will be distributed to all Pioneers visiting the headquarters."

WHY telephone companies, large & small, demand phone booths of STAINLESS OR ZINC-COATED STEEL in preference to other alloys

1 STEEL is a rigid metal of great durability

2 STEEL retains its luster, won't pit or tarnish

3 STEEL defies weather, climate, time, grime



As more and more telephone companies discover steel's unique advantages, the preference for Sherron steel booths becomes more pronounced.

Steel booths show scant wear and tear, even after years of hard use and exposure . . . and normal cleaning methods will maintain the lustrous good looks of steel booths, whether they be stainless steel or attractively colored zinc-coated steel with Dupont baked enamel finishes. Sherron steel booths are fireproof . . . UL and REA approved.

Standardization of Sherron booths permits single or multiple installation at any time.

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SEE OUR EXHIBIT, USITA CONVENTION, OCT. 12, 13, 14, CONRAD HILTON HOTEL, ROOM 560

EXHIBITORS AT USITA CONVENTION

Modern and up-to-date telephone equipment and supplies will be on display at the coming USITA convention. Independent manufacturers and suppliers can and do render vital assistance and advice to operating companies in solving their problems. Be sure and visit them in their display rooms, listed alphabetically below. This list was furnished by the USITA Manufacturers Exhibit Committee and is complete as of Sept. 21.

Acme Visible Records Inc. . . . . 519-A—520-A
Addressograph-Multigraph Corp. 522
Airtronics International Corp. 626-A
American Steel & Wire Co. 635-A
Anaconda Wire & Cable Co. 659
Ansonia Wire & Cable Co. 547
Audichron Co., The 636-A
Automatic Electric Sales Corp. . . . . 504—505—507—509 602—610

Baker-Wood Division, D. B. Frampton & Co. 634-A
W. M. Bashlin Co. 530-A
Benner-Nawman, Inc. 545
L. M. Berry & Co. 556-A
Blaw-Knox Co. 629-A
Bohnsack Equipment Co. 633-A
Brown Mfg. Co. 652
Buckeye Telephone & Supply Co. 532-A
Budelman Electronics Corp. 656-A
Burroughs Corp. 613
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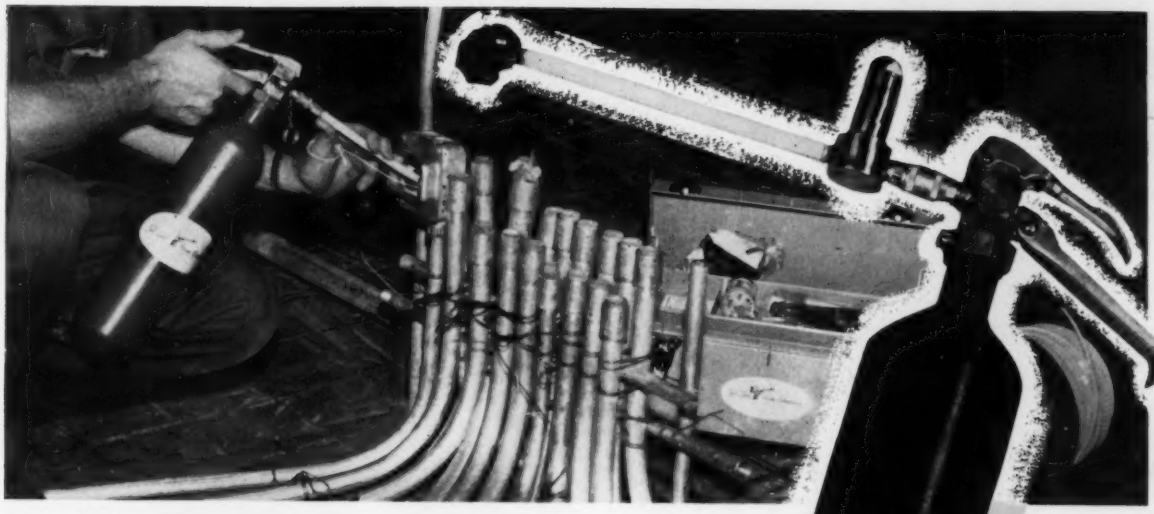

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eliminates snaking in 1/2" and 3/4" conduit!

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You can throw away your fish tape, because the new Jet Line Cylinder makes short work of wiring ½" and ¾" conduit . . . SAVES UP TO 70% of wire-pulling costs!

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Completely safe, the Jet Line Cylinder uses no inflammable substances or explosives of any kind. Both the nylon line and polyethylene rope are non-conductors, so there's no danger in working hot panels.

The Jet Line Cylinder Kit can pay for itself on one or two jobs! Kit contains: cylinder with valve, pressure regulator, valve operating mechanism, and full pressure attachment with variable head. Cylinder can be refilled; spare cylinders available. Order your Jet Line Cylinder Kit today . . . forget fish tape forever!

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★USE IN ANY LENGTH ½" or ¾" CONDUIT

Sweeps through multiple bends, offsets . . . eliminates snaking in any length conduit. Jet Line Cylinder is economical to buy and use. Easy to handle . . . weighs only 9 lbs.

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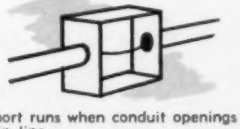

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RAYTHEON UNVEILS ITS NEW 200-AMPERE CHARGER at the U.S.I.T.A. national convention in Chicago. See this and other new Raytheon power equipment in Room 551A.

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CHICAGO, 1959—Raytheon answers the power supply needs of a rapidly growing telephone industry by expanding its 50- and 130-volt battery charger lines.

This new power equipment utilizes Raytheon-developed and thoroughly tested silicon-rectifier circuitry that offers greater reliability with less maintenance.

These new, highly efficient Rectichargers are up to 50% smaller than comparable selenium models — saving valuable floor and rack space.

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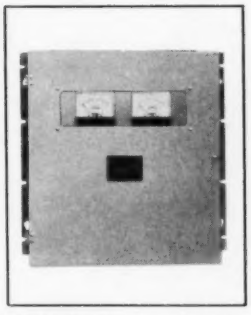
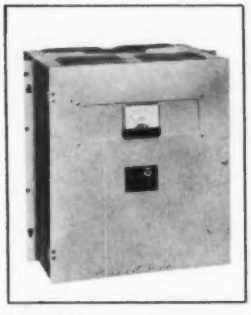
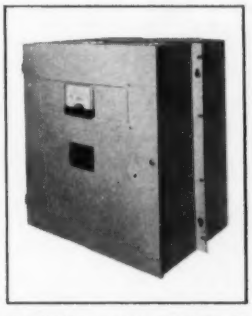
RC-50K200: 200-ampere, silicon battery charger is added to Raytheon's 50-volt Rectichargers line. This unit is 46 inches high by 30 inches wide by 29 inches deep—less than half the size of its selenium counterpart.



RC-140A3: This new 3-ampere, 66-cell charger was designed for 130-140 volt power-board applications. Companion 6- and 12-ampere units, silicon CEMF cells and control panels give Raytheon a complete power panel line.



RC-50A9: This new 9-ampere rating provides reserve capacity for growing exchanges. RC-50A9 adapts to 19, 23 or 30-inch mounting and occupies only 15 inches of vertical rack space.



RC-50A18: Another intermediate charger rating to meet a recognized power requirement for large PBX's and medium-sized CDO's. This 18-ampere silicon charger is only 20 inches high.

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What is the BDSA Communications National Defense Executive Reserve?

By ALEXANDER J. FALK*

FROM experience gained during World War II, and later from the Korean conflict, it became apparent to knowledgeable persons in government, that we were as much in need of an industrial reserve force as we were of a military reserve. Therefore, on Feb. 15, 1956 President Eisenhower signed an Executive Order providing for the establishment of a National Defense Executive Reserve, authorized by the Defense Production Act.

We, in the Business and Defense Services Administration's (BDSA) Communications Industries Division of the United States Department of Commerce, deal with peace time problems of the communications industrial segment of our national economy and *have the important responsibility for specific industrial mobilization planning for national emergencies.*

In considering our subject it might be well to first set the pattern by saying that communications, the pulse-beat of the nation during peace times would become its heart-beat following an atomic attack on the United States. Without communications after attack, Washington would be isolated from the rest of the country and each community would become an independent sovereignty without central direction. Consider the general planning climate with which we in the Business and Defense Services Administration and the Defense Executive Reservists would be concerned:

The United States has been subjected to severe nuclear attack. For some period of time, there is no effective federal government operating from Washington. When effective federal government direction and administration is resumed, the first phase of the post-attack situation, for which we are planning, has concluded and implementation of new ground rules for government is being established. Widespread damage has been done to the country. Many of our large industrial centers have been destroyed by blast or fire. Radioactive fallout will blanket and render inoperable large land areas not subjected to direct blast damage. Casualties are substantial and number many millions. The problem of human and national survival is not merely a government problem; it has become everybody's problem.

A. J. FALK

Reservists' Qualifications

The need for large numbers of qualified and trained individuals to direct the industrial survival and rehabilitation efforts of our nation is apparent to all. This is the basis for the National Defense Executive Reserve. Where to get the required persons presents still another problem. First, any person to be eligible for the Executive Reserve must be a man of unquestioned loyalty to his country. Secondly, he must be willing and able to spare time from his regular work and his family, to assume the extra burden of training and study of government activities to equip him for the job for which he is volunteering. Thirdly, he must be a man well versed in his industry, and lastly of proven ability.

The degree to which a Business and Defense Services Administration Communications Executive Reservist can help after all-out attack upon the United States is dependent upon the steps which have been taken prior to the attack to permit him to be effective.

One basic assumption underlies our whole approach to the foregoing situation. We assume that under these conditions our people, our local community governments, would turn to our Industrial Executive Reservists for help. Industrial Executive Reservists are more than people of organization, they are in the business of dealing with new situations. They are in the business of dealing with people. This is the very kind of experience and knowledge that would be a premium for dealing most effectively with the consequences of an

*Mr. Falk is Director of the Communications Industries Division, U. S. Department of Commerce, Washington 25, D. C.

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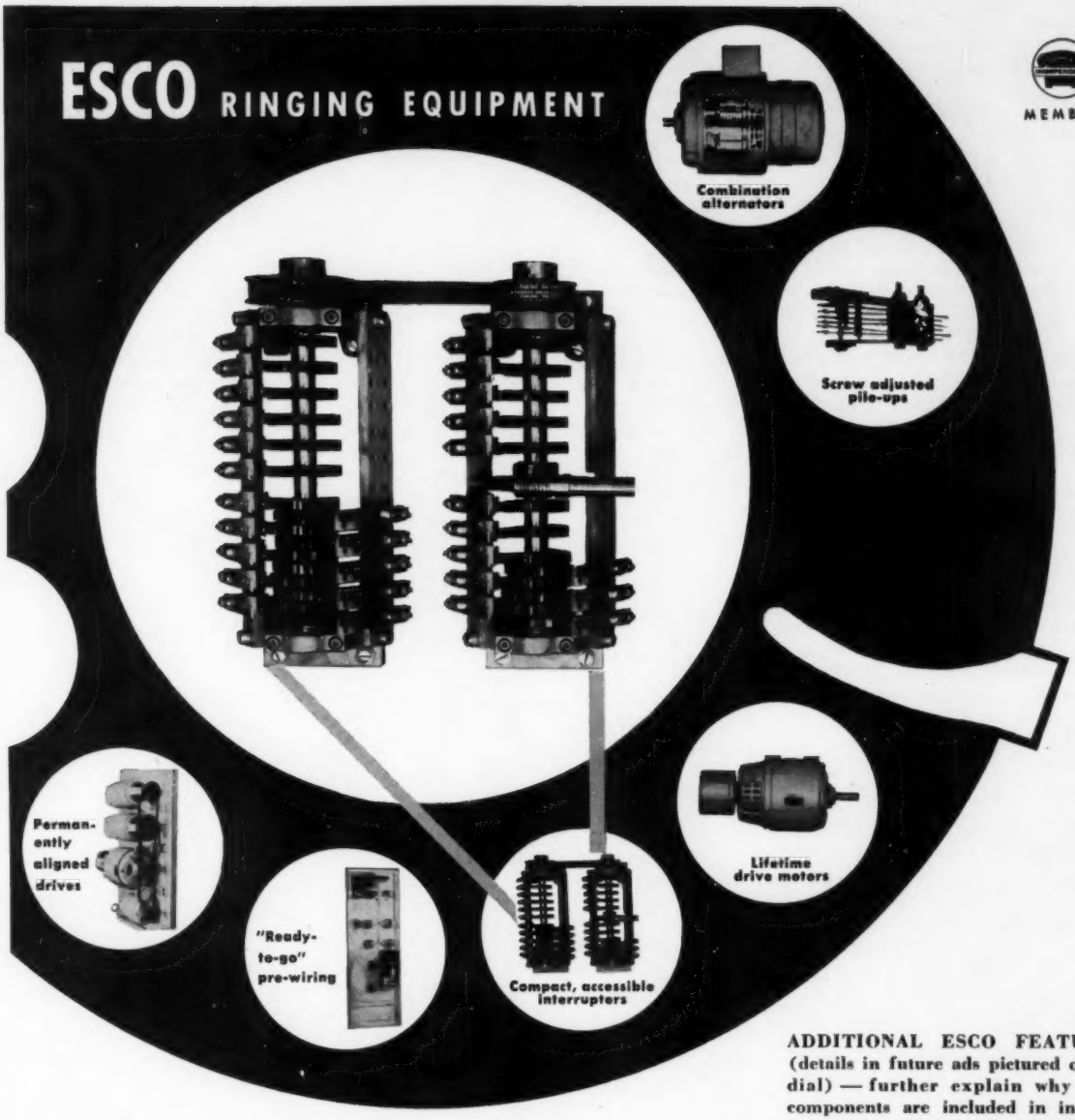
MEMBER



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For longer life and lower up-keep, Esco interrupters are equipped with nylon cams, followers and actuators. This material, with its excellent wearing qualities, has an outstanding record in these applications. Another point — cams are secured to the shaft with a set screw and a key. This extra feature assures permanent positioning and accurate timing.

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attack upon our country. Trained and experienced leadership is always the most scarce of all commodities, and the Industry Reservist represents our most important source of supply.

Procedural details are being worked out so that the Executive Reservists can automatically be absorbed into an emergency production agency and each reservist will operate in his own community until such time as he is instructed to report to a regional OCDM office. There will be established eight regional production offices on a standby basis, armed with adequate facts and records, and the reservists will thus be given the opportunity to locate at centers closer to their home areas so that each reservist, in turn, can report and ready himself to assist in the national effort and bring about the effective operation and recovery of the communications industry.

Scattered Over Country

The Business and Defense Services Administration Communications Executive Reservists are scattered throughout the country including our new states, Alaska and Hawaii.

Who are these men we have called to serve? They are representatives of telephone companies, chosen with your cooperation. They represent all segments of the industry—Independent operating companies, manufacturers of communications equipment, Bell operating companies, Western Union, Commercial Central Station operating companies, and others of communications companies of the nation. They represent practically every type of speciality in their respective companies.

The Independents and the other important operators are cooperating wholeheartedly with the BDSA Communications Industries Division by furnishing a substantial number of Executive Reservists who, in an emergency situation, will advise and assist their local civil defense emergency operating center concerning all production activities, such as assessment and reporting of industrial damage and capability, industrial inspection, production expediting, and materials distribution.

Would Have Priorities

More specifically, in the post-attack period the Communications Executive Reservist would use priorities and allocation powers and related authorities vested in BDSA, or its successor agency, for expediting the production of essential survival items, equipment and supplies needed to maintain operations and essential services furnished by the communications industry, material required for the production of military items, supplies and equipment, and to carry out emergency programs authorized by policy determinations issued by the Office of Civil and Defense Mobilization.

The communications industry is to be complimented on the many practical steps which have been taken to prevent a catastrophe or a break in the continuity of essential communications, and their plans, together with the training and aid of the reservists, will provide the insurance that the government feels is so vital and necessary for essential service and the welfare of the nation.

The communications industry is not alone in this planning. There are at present approximately 1,200 persons from all segments of industry registered in the BDSA Executive Reserve. Of this entire group, approximately 83 men represent the telephone industry, and their geographical spread makes it practical for them to serve almost immediately on an emergency basis.

Each of these men and their normal occupational training is important to the communications industry, since we have long ago found that no segment of our economy can be entirely self-sustaining. We find, for example, that there is need for cooperation between industries in the procurement of materials and services. Thus, each of these men trained in his own specialized field, and further trained in the needs of the nation for defense, can serve not only his own industry in furthering plans for defense, but can also serve the whole nation and members of other industries in coping with problems which may arise.

Group Meetings Held

You may ask, in what manner have these men been trained and equipped. Each has been given a complete security check to determine his loyalty, and further to determine his ability to act under the conditions existent, he has been furnished hypothetical problems to solve which closely approximate those conditions which he may encounter. He has attended group meetings either on a regional basis or on a national scope at which lectures and discussions have been held concerning his work in the reserve.

At this juncture the reader might like to know more about BDSA since this agency would have a great deal to do with the communications industry rehabilitation. The Business and Defense Services Administration is responsible for the production resources of the nation in the event of a national emergency. As the nucleus of an emergency production agency, it serves as the delegate agency of the Office of Civil and Defense Mobilization with responsibility for achieving maximum utilization of the production resources of the nation to meet any type of national emergency. It will have complete administration of priority powers to assist in assuring completion of current military and atomic energy programs of production and construction. BDSA is also charged with the responsibility of assisting and encouraging industry to develop plans and programs for insuring the continuity of essential production and services in the event of a general war and massive nuclear attack on this country.

Low Cost to Government

Since all of the reservists have enlisted on a voluntary basis, the cost to the government to date has been very slight. Reservists have given unstintingly of their time for the purpose of meetings, instructions and training programs. Most have attended the national and regional meetings at no expense to the government. There, of course, have been certain organizational and administrative expenses, as well as some cost involved in the preparation of training material, which has been borne by the government.

No description of the Communications Executive Reservist role would be complete without an acknowledgement of the contribution of the industry in setting up this program. It has been necessary for these men, all of them vital to their own companies, to be absent from their normal work for periods of time to engage in the meetings and training sessions. The total industry has wholeheartedly cooperated in making this possible.

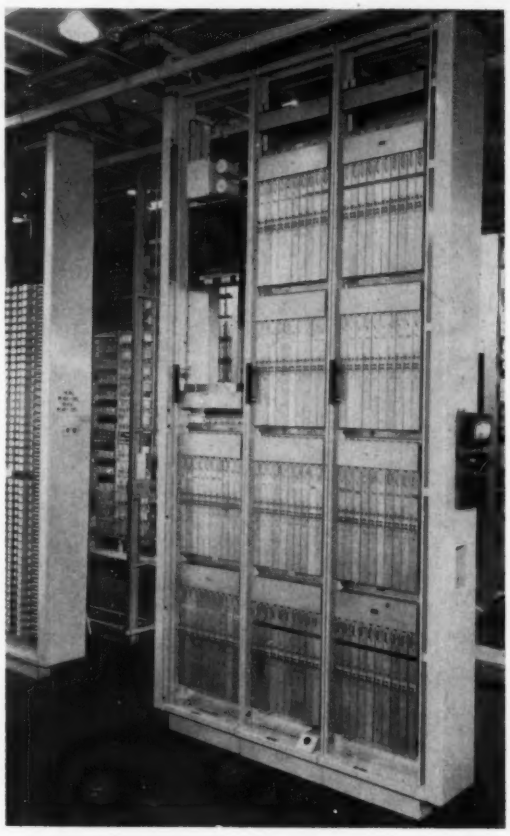
The recruitment of Communications Reservists, however, has not been limited to the operating telephone companies and the manufacturers, since the United States Independent Telephone Association, state associations, and the industry's recognized publications have assisted materially. The associations also have prepared material which has helped both in defense planning and reserve training.

Each reservist is furnished with a civil defense identification card, a post-attack responsibilities card, and a pocket size Post-Attack Manual, which provide reporting and operating instructions and authorize the use of all priorities for travel, gasoline, etc., which may be provided for federal employes.

In briefly summing up the importance of this program, it may be said that if this country is to wage a successful defense against any aggressor, we cannot depend on military might alone. An effective, well-trained Executive Reserve plays an essential role in plans for post-attack operations of the communications industry and is a vital part of our national defense posture.

WE ARE READY!
ARE YOU!

Room 654A USITA CONVENTION



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PANHANDLE now offers Type "X" equipment to the communication industry on a direct to user basis. For additional engineering information and application assistance contact:

PANHANDLE is pleased to offer on its 10th anniversary another first to the communication industry — the Type "X", angular modulated transistorized cable carrier equipment. The Type "X" equipment with its many advanced features represents the completion of 2½ years of development and field testing.

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2. Incorporates angular modulation with its advantages of AM noise rejection, capture, inherent self-regulation and high signal-to-noise ratio.
3. A new basic repeater design that provides 20 DB gain, preserves cable pair continuity, automatically balances the cable pair and allows use of mixed gauges of cable.
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5. Self-contained mercury cell powered meters allow ease and simplicity in lineup and maintenance.
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How to Measure Insertion Loss

By JOHN V. BUSCEMI and
PAUL G. LAMBIDAKIS*

Part I

MORE than ever, today's customer wants his telephone conversation to be pleasant and natural. With Direct Distance Dialing (DDD) in the picture, it is possible to include as many as seven intertoll links and two terminating links (toll connecting trunks) in a conversation between two telephones within the United States. It is highly important that objectives for each link (and components in each link) are such that a large transmission loss does not result from a number of small excess losses, all in tandem. It is no less necessary that deviations in loss through a band of frequencies be kept within limits.

Obviously, installation and lineup measurements of loss should be made, but that is not enough. Experience shows that components, equipment and facilities change their electrical characteristics with time. For example, tubes age and conductors deteriorate. In terminating links, it has been suggested that the loss of carrier circuits be checked every three months and VF repeatered circuits every six months on a routine maintenance basis. The measurement of loss is not only an indication of lost signal strength, but is also interrelated with other factors which may jeopardize good transmission—such as echo, singing, noise and crosstalk. In addition to trunks, thousands of subscriber lines are presently derived by carrier. Again, proper lineup and maintenance of loss have much to do with the degree of subscriber satisfaction with this newer method of providing service.

The method most frequently used to determine the loss is the *insertion loss* measurement. It offers one of the more important tools for determining in large measure the transmission adequacy of an existing system, including that of individual components. It also provides means for proper routine maintenance procedures. The principles involved are simple and logical:

(1) Take an oscillator with a known internal impedance.
(2) Connect to that oscillator another impedance of the same value, as a load, and deliver to the load a known amount of sine wave power (measured indirectly, with a voltmeter) at a given frequency.
(3) Without changing the oscillator controls in any respect, *insert* the network or facilities to be measured *between* the oscillator and the load.
(4) The change in power dissipated by the load in (3) relative to (2), expressed in db, is the insertion loss.

Insertion loss is, therefore, defined as the loss, in decibels, which results when a network is introduced between a supply and a load.

While we speak of insertion "loss," it is quite feasible to measure gains, such as provided by a voice repeater, by the same method. In such a case, the power in the load in (3) is greater than that in (2), and we have an *insertion gain.*

So long as these four principles are not violated, the measurement will make sense. However, there are pitfalls in practical application. They have to do with:

(1) Calibration and termination load characteristics.
(2) Voltmeter characteristics.
(3) Oscillator characteristics.
(4) Balance to ground characteristics.
(5) Noise in facility under test.

Before taking up the pitfalls, it would seem prudent to review the terminology used for measuring power level. *DBM* is a measure of power. *Zero DBM* (0 DBM) is a reference level and denotes a power level of one milliwatt dissipated in 600 ohms. All plus DBM's (+ DBM) indicate more power than zero DBM and all minus DBM's less.

If one milliwatt of power is dissipated in a 600-ohm resistor, the rms voltage across that resistor will be 0.775 volts. (All volts we will discuss here will be sine-wave volts). Therefore, 0.775 volts across 600 ohms is 0 DBM. Higher volts across 600 ohms indicate plus DBM's and lower volts minus. For convenience, we have shown the relationship between DBM's and volts across 600 ohms in Table I (composed of six sub-tables)—See page 64.

EXAMPLE 1. *Conversion of Volts Across 600 Ohms to DBM.* At various stages of a test, three voltage readings are taken: 13.5, 0.775 and 0.00141 volts. What power levels in DBM are indicated by the readings? From *Table I:*

Volts Across 600 Ohms	Power Level in DBM	
13.5	+24.8	ANS.
0.775	0	ANS.
0.00141	−54.8	ANS.

EXAMPLE 2. *Conversion of DBM to Volts Across 600 Ohms.* A transmission measuring set calibrated in DBM reads as follows for three different measurements: +15.6, −7.7 and −42.3. To how many volts across 600 ohms do these correspond? From *Table I:*

Power Level in DBM	Volts Across 600 Ohms	
+15.6	4.67	ANS.
− 7.8	0.316	ANS.
−42.3	0.00594	ANS.

*Mr. Buscemi and Mr. Lambidakis are with the Rural Electrification Administration in Washington, D. C.

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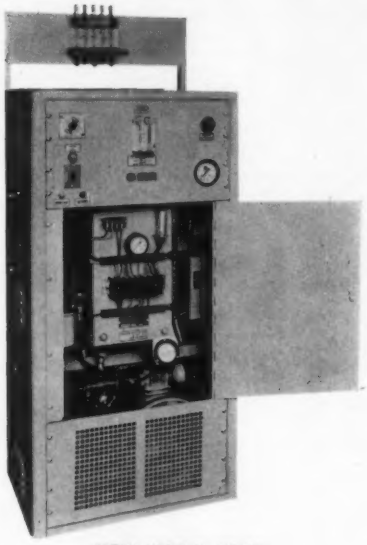
THE MODEL "RC" DEHYDRATOR (AUTOMATIC)

for pressurizing aerial and underground telephone cables



NEW MODEL "RC" cabinet mounted

The Model "RC" Dehydrator is designed to supply dry air to telephone cables. Among its many outstanding safety features are:

- Hi-Lo pressure switch for alarm
- Humistat for alarm above 4% R.H.
- Power failure relays and separate fustat
- By-Pass Valve & Alarm for excessive R.H.
- Mechanical control valve for stand-by air supply (O.P.N.) in event of power failure
- Additional safety features on air compressor
- Power supply is 115-volt, AC on the Dehydrator and Air Compressor
- Power consumption—2 AMPS

The Model "RC" and "R" Dehydrators (Automatic) are designed for small installations of 80 miles or less of cable. The Model "RC" is a floor mounted unit, and the Model "R" is for wall mounting. Operating voltage is 115/220 volts, 1 phase, 60 cycle, and the output is 700 standard cubic feet per day maximum, with a dewpoint of —40°F. and power consumption of 2 AMPS.

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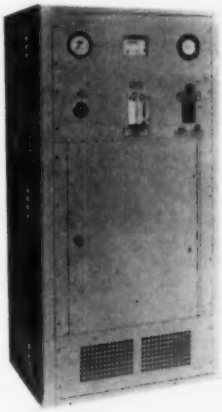
MOBILE POWER UNIT (Model MPU-4-C)

- Generator (slow speed for quietness) 2500 Watt, 110-Volt DC
- Pump—2800 GPH Diaphragm to remove seepage and drain back
- Air Compressor —to put cables under pressure for cutovers or repairs
- Furnished with or without pump and compressor.

MODEL "A" Air Compressor Dehydrator

Exchange unit equipment designed to supply chemically dry air for telephone cables, aerial and underground, this unit can supply as many as 60 cables. It is equipped with volume recording air meter, high and low pressure alarm switches, humidstat and hour meter.



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Relative power levels may be expressed in *DB's*, so the difference between two DBM levels may be expressed in DB's. A level of +10 DBM is 10 DB higher than 0 DBM; —10 DBM is 10 DB lower. A level of +10 DBM is 20 DB higher than a level of —10 DBM. The *algebraic* difference must be taken into account.

Calibration and Terminal Load

A 600-ohm resistance load is preferred for calibrating oscillator output and terminating the "unknown" in the majority of insertion loss measurements. This is because 600 ohms is a sort of average of the many values of impedance one finds among equipment and facilities in telephone plant. Certainly, at high frequencies, 8 to 12-inch spaced conductor pairs tend to have a characteristic impedance around this figure, and, for copper pairs, even the impedance at voice frequencies approaches 600 ohms. At any rate, all insertion loss measurements considered here will be "between 600 ohms," *i.e.*, the internal oscillator impedance (below) will be 600 ohms as well as that of the resistor used to calibrate the oscillator output and terminate the equipment or facility under test.

Is precision needed for the 600-ohm resistor for calibrating and terminating? We should bear in mind that many frequencies may be of interest. Between voice drops of trunks we are concerned with response, or the changes in loss as frequency varies, say, from 300 to 3000 cps. Some carrier systems have their first channel allocated below 10 kilocycles. Other

Relationship of DBM Versus RMS Voltage Across 600 OHMS

(+10.0 to / 10.0 DBM)
(2.45 to 8.45 Volts)

DBM	VOLTS	DBM	VOLTS	DBM	VOLTS	DBM	VOLTS
/10.0	8.45	/10.0	11.8	/10.0	7.75	/11.0	4.36
/9.9	8.42	/9.9	13.6	/9.9	7.66	/10.9	4.31
/9.8	8.39	/9.8	13.5	/9.8	7.57	/10.8	4.26
/9.7	8.37	/9.7	13.3	/9.7	7.48	/10.7	4.21
/9.6	8.34	/9.6	13.2	/9.6	7.40	/10.6	4.16
/9.5	8.31	/9.5	13.0	/9.5	7.31	/10.5	4.11
/9.4	8.28	/9.4	12.9	/9.4	7.23	/10.4	4.07
/9.3	8.26	/9.3	12.7	/9.3	7.15	/10.3	4.02
/9.2	8.23	/9.2	12.6	/9.2	7.06	/10.2	3.97
/9.1	8.21	/9.1	12.4	/9.1	6.98	/10.1	3.93
/9.0	8.18	/9.0	12.3	/9.0	6.90	/10.0	3.88
/8.9	8.16	/8.9	12.1	/8.9	6.83	/9.9	3.84
/8.8	8.13	/8.8	12.0	/8.8	6.75	/9.8	3.79
/8.7	8.11	/8.7	11.8	/8.7	6.67	/9.7	3.75
/8.6	8.09	/8.6	11.7	/8.6	6.59	/9.6	3.71
/8.5	8.06	/8.5	11.6	/8.5	6.52	/9.5	3.67
/8.4	8.04	/8.4	11.5	/8.4	6.44	/9.4	3.62
/8.3	8.01	/8.3	11.3	/8.3	6.37	/9.3	3.58
/8.2	7.99	/8.2	11.2	/8.2	6.30	/9.2	3.54
/8.1	7.97	/8.1	11.1	/8.1	6.22	/9.1	3.50
/8.0	7.94	/8.0	10.9	/8.0	6.15	/9.0	3.46
/7.9	7.92	/7.9	10.8	/7.9	6.08	/8.9	3.42
/7.8	7.90	/7.8	10.7	/7.8	6.01	/8.8	3.38
/7.7	7.87	/7.7	10.6	/7.7	5.94	/8.7	3.34
/7.6	7.85	/7.6	10.4	/7.6	5.88	/8.6	3.30
/7.5	7.83	/7.5	10.3	/7.5	5.81	/8.5	3.26
/7.4	7.81	/7.4	10.2	/7.4	5.74	/8.4	3.23
/7.3	7.79	/7.3	10.1	/7.3	5.68	/8.3	3.19
/7.2	7.77	/7.2	9.95	/7.2	5.61	/8.2	3.16
/7.1	7.75	/7.1	9.87	/7.1	5.55	/8.1	3.12
/7.0	7.73	/7.0	9.74	/7.0	5.48	/8.0	3.09
/6.9	7.71	/6.9	9.64	/6.9	5.42	/7.9	3.05
/6.8	7.69	/6.8	9.53	/6.8	5.36	/7.8	3.01
/6.7	7.67	/6.7	9.42	/6.7	5.30	/7.7	2.98
/6.6	7.66	/6.6	9.31	/6.6	5.24	/7.6	2.95
/6.5	7.64	/6.5	9.21	/6.5	5.18	/7.5	2.91
/6.4	7.62	/6.4	9.10	/6.4	5.12	/7.4	2.88
/6.3	7.60	/6.3	8.99	/6.3	5.06	/7.3	2.85
/6.2	7.58	/6.2	8.89	/6.2	5.00	/7.2	2.81
/6.1	7.57	/6.1	8.79	/6.1	4.94	/7.1	2.78
/6.0	7.55	/6.0	8.69	/6.0	4.89	/7.0	2.75
/5.9	7.53	/5.9	8.59	/5.9	4.83	/6.9	2.72
/5.8	7.51	/5.8	8.49	/5.8	4.78	/6.8	2.69
/5.7	7.49	/5.7	8.40	/5.7	4.72	/6.7	2.66
/5.6	7.48	/5.6	8.30	/5.6	4.67	/6.6	2.62
/5.5	7.46	/5.5	8.21	/5.5	4.61	/6.5	2.59
/5.4	7.44	/5.4	8.11	/5.4	4.56	/6.4	2.56
/5.3	7.42	/5.3	8.02	/5.3	4.51	/6.3	2.54
/5.2	7.40	/5.2	7.93	/5.2	4.46	/6.2	2.51
/5.1	7.39	/5.1	7.84	/5.1	4.41	/6.1	2.48
/5.0	7.37	/5.0	7.75	/5.0	4.36	/6.0	2.45

Relationship of DBM Versus RMS Voltage Across 600 OHMS

(/10.0 to -10.0 DBM)
(2.45 to 0.845 Volts)

DBM	VOLTS	DBM	VOLTS	DBM	VOLTS	DBM	VOLTS
/0.0	2.45	/ 5.0	1.38	- 0.0	0.775	- 5.0	0.436
/ 9.9	2.42	/ 4.9	1.36	- 0.1	0.766	- 5.1	0.431
/ 9.8	2.39	/ 4.8	1.35	- 0.2	0.757	- 5.2	0.426
/ 9.7	2.37	/ 4.7	1.33	- 0.3	0.748	- 5.3	0.421
/ 9.6	2.34	/ 4.6	1.32	- 0.4	0.740	- 5.4	0.416
/ 9.5	2.31	/ 4.5	1.30	- 0.5	0.731	- 5.5	0.411
/ 9.4	2.29	/ 4.4	1.29	- 0.6	0.723	- 5.6	0.407
/ 9.3	2.26	/ 4.3	1.27	- 0.7	0.715	- 5.7	0.402
/ 9.2	2.23	/ 4.2	1.26	- 0.8	0.706	- 5.8	0.397
/ 9.1	2.21	/ 4.1	1.24	- 0.9	0.698	- 5.9	0.393
/ 9.0	2.18	/ 4.0	1.23	- 1.0	0.690	- 6.0	0.388
/ 8.9	2.16	/ 3.9	1.22	- 1.1	0.683	- 6.1	0.384
/ 8.8	2.13	/ 3.8	1.20	- 1.2	0.675	- 6.2	0.379
/ 8.7	2.11	/ 3.7	1.19	- 1.3	0.667	- 6.3	0.375
/ 8.6	2.09	/ 3.6	1.17	- 1.4	0.659	- 6.4	0.371
/ 8.5	2.06	/ 3.5	1.16	- 1.5	0.652	- 6.5	0.367
/ 8.4	2.04	/ 3.4	1.15	- 1.6	0.644	- 6.6	0.362
/ 8.3	2.01	/ 3.3	1.13	- 1.7	0.637	- 6.7	0.358
/ 8.2	1.99	/ 3.2	1.12	- 1.8	0.630	- 6.8	0.354
/ 8.1	1.97	/ 3.1	1.11	- 1.9	0.622	- 6.9	0.350
/ 8.0	1.95	/ 3.0	1.09	- 2.0	0.615	- 7.0	0.346
/ 7.9	1.92	/ 2.9	1.08	- 2.1	0.608	- 7.1	0.342
/ 7.8	1.90	/ 2.8	1.07	- 2.2	0.601	- 7.2	0.338
/ 7.7	1.88	/ 2.7	1.06	- 2.3	0.594	- 7.3	0.334
/ 7.6	1.86	/ 2.6	1.04	- 2.4	0.588	- 7.4	0.330
/ 7.5	1.84	/ 2.5	1.03	- 2.5	0.581	- 7.5	0.327
/ 7.4	1.82	/ 2.4	1.02	- 2.6	0.574	- 7.6	0.323
/ 7.3	1.79	/ 2.3	1.01	- 2.7	0.568	- 7.7	0.319
/ 7.2	1.77	/ 2.2	0.996	- 2.8	0.561	- 7.8	0.316
/ 7.1	1.75	/ 2.1	0.987	- 2.9	0.555	- 7.9	0.312
/ 7.0	1.73	/ 2.0	0.975	- 3.0	0.548	- 8.0	0.309
/ 6.9	1.71	/ 1.9	0.964	- 3.1	0.542	- 8.1	0.305
/ 6.8	1.69	/ 1.8	0.953	- 3.2	0.536	- 8.2	0.301
/ 6.7	1.68	/ 1.7	0.942	- 3.3	0.530	- 8.3	0.298
/ 6.6	1.66	/ 1.6	0.931	- 3.4	0.524	- 8.4	0.295
/ 6.5	1.64	/ 1.5	0.921	- 3.5	0.518	- 8.5	0.291
/ 6.4	1.62	/ 1.4	0.910	- 3.6	0.512	- 8.6	0.288
/ 6.3	1.60	/ 1.3	0.899	- 3.7	0.506	- 8.7	0.285
/ 6.2	1.58	/ 1.2	0.889	- 3.8	0.500	- 8.8	0.281
/ 6.1	1.56	/ 1.1	0.879	- 3.9	0.494	- 8.9	0.278
/ 6.0	1.55	/ 1.0	0.868	- 4.0	0.489	- 9.0	0.275
/ 5.9	1.53	/ 0.9	0.859	- 4.1	0.483	- 9.1	0.272
/ 5.8	1.51	/ 0.8	0.849	- 4.2	0.478	- 9.2	0.269
/ 5.7	1.49	/ 0.7	0.840	- 4.3	0.472	- 9.3	0.266
/ 5.6	1.48	/ 0.6	0.830	- 4.4	0.467	- 9.4	0.262
/ 5.5	1.46	/ 0.5	0.820	- 4.5	0.462	- 9.5	0.259
/ 5.4	1.44	/ 0.4	0.811	- 4.6	0.456	- 9.6	0.256
/ 5.3	1.43	/ 0.3	0.802	- 4.7	0.451	- 9.7	0.254
/ 5.2	1.41	/ 0.2	0.792	- 4.8	0.446	- 9.8	0.251
/ 5.1	1.39	/ 0.1	0.784	- 4.9	0.441	- 9.9	0.248
/ 5.0	1.38	/ 0.0	0.775	- 5.0	0.436	-10.0	0.245

Relationship of DBM Versus RMS Voltage Across 600 OHMS

(-10.0 to -30.0 DBM)
(0.845 to 0.0845 Volts)

DBM	VOLTS	DBM	VOLTS	DBM	VOLTS	DBM	VOLTS
-10.0	0.845	-15.0	0.436	-20.0	0.0775	-25.0	0.0436
-10.1	0.842	-15.1	0.431	-20.1	0.0766	-25.1	0.0431
-10.2	0.839	-15.2	0.426	-20.2	0.0757	-25.2	0.0426
-10.3	0.837	-15.3	0.421	-20.3	0.0748	-25.3	0.0421
-10.4	0.834	-15.4	0.416	-20.4	0.0740	-25.4	0.0416
-10.5	0.831	-15.5	0.411	-20.5	0.0731	-25.5	0.0411
-10.6	0.829	-15.6	0.407	-20.6	0.0723	-25.6	0.0407
-10.7	0.826	-15.7	0.402	-20.7	0.0715	-25.7	0.0402
-10.8	0.823	-15.8	0.397	-20.8	0.0706	-25.8	0.0397
-10.9	0.821	-15.9	0.393	-20.9	0.0698	-25.9	0.0393
-11.0	0.818	-16.0	0.388	-21.0	0.0690	-26.0	0.0388
-11.1	0.816	-16.1	0.384	-21.1	0.0683	-26.1	0.0384
-11.2	0.813	-16.2	0.379	-21.2	0.0675	-26.2	0.0379
-11.3	0.811	-16.3	0.375	-21.3	0.0667	-26.3	0.0375
-11.4	0.809	-16.4	0.371	-21.4	0.0659	-26.4	0.0371
-11.5	0.806	-16.5	0.367	-21.5	0.0652	-26.5	0.0367
-11.6	0.804	-16.6	0.362	-21.6	0.0644	-26.6	0.0362
-11.7	0.801	-16.7	0.358	-21.7	0.0637	-26.7	0.0358
-11.8	0.799	-16.8	0.354	-21.8	0.0630	-26.8	0.0354
-11.9	0.797	-16.9	0.350	-21.9	0.0622	-26.9	0.0350
-12.0	0.795	-17.0	0.346	-22.0	0.0615	-27.0	0.0346
-12.1	0.792	-17.1	0.342	-22.1	0.0608	-27.1	0.0342
-12.2	0.790	-17.2	0.338	-22.2	0.0601	-27.2	0.0338
-12.3	0.788	-17.3	0.334	-22.3	0.0594	-27.3	0.0334
-12.4	0.786	-17.4	0.330	-22.4	0.0588	-27.4	0.0330
-12.5	0.784	-17.5	0.327	-22.5	0.0581	-27.5	0.0327
-12.6	0.782	-17.6	0.323	-22.6	0.0574	-27.6	0.0323
-12.7	0.779	-17.7	0.319	-22.7	0.0568	-27.7	0.0319
-12.8	0.777	-17.8	0.316	-22.8	0.0561	-27.8	0.0316
-12.9	0.775	-17.9	0.312	-22.9	0.0555	-27.9	0.0312
-13.0	0.773	-18.0	0.309	-23.0	0.0548	-28.0	0.0309
-13.1	0.771	-18.1	0.305	-23.1	0.0542	-28.1	0.0305
-13.2	0.769	-18.2	0.301	-23.2	0.0536	-28.2	0.0301
-13.3	0.767	-18.3	0.298	-23.3	0.0530	-28.3	0.0298
-13.4	0.766	-18.4	0.295	-23.4	0.0524	-28.4	0.0295
-13.5	0.764	-18.5	0.291	-23.5	0.0518	-28.5	0.0291
-13.6	0.762	-18.6	0.288	-23.6	0.0512	-28.6	0.0288
-13.7	0.760	-18.7	0.285	-23.7	0.0506	-28.7	0.0285
-13.8	0.758	-18.8	0.281	-23.8	0.0501	-28.8	0.0281
-13.9	0.756	-18.9	0.278	-23.9	0.0494	-28.9	0.0278
-14.0	0.755	-19.0	0.275	-24.0	0.0489	-29.0	0.0275
-14.1	0.753	-19.1	0.272	-24.1	0.0483	-29.1	0.0272
-14.2	0.751	-19.2	0.269	-24.2	0.0478	-29.2	0.0269
-14.3	0.749	-19.3	0.266	-24.3	0.0472	-29.3	0.0266
-14.4	0.748	-19.4	0.262	-24.4	0.0467	-29.4	0.0262
-14.5	0.746	-19.5	0.259	-24.5	0.0461	-29.5	0.0259
-14.6	0.744	-19.6	0.256	-24.6	0.0456	-29.6	0.0256
-14.7	0.743	-19.7	0.254	-24.7	0.0451	-29.7	0.0254
-14.8	0.741	-19.8	0.251	-24.8	0.0446	-29.8	0.0251
-14.9	0.739	-19.9	0.248	-24.9	0.0441	-29.9	0.0248
-15.0	0.738	-20.0	0.245	-25.0	0.0436	-30.0	0.0245

Relationship of DBM Versus RMS Voltage Across 600 OHMS

(-30.0 to -50.0 DBM)
(0.0845 to 0.00845 Volts)

DBM	VOLTS	DBM	VOLTS	DBM	VOLTS	DBM	VOLTS
-30.0	0.0845	-35.0	0.00436	-40.0	0.00775	-45.0	0.000436
-30.1	0.0842	-35.1	0.00431	-40.1	0.00766	-45.1	0.000431
-30.2	0.0839	-35.2	0.00426	-40.2	0.00757	-45.2	0.000426
-30.3	0.0837	-35.3	0.00421	-40.3	0.00748	-45.3	0.000421
-30.4	0.0834	-35.4	0.00416	-40.4	0.00740	-45.4	0.000416
-30.5	0.0831	-35.5	0.00411	-40.5	0.00731	-45.5	0.000411
-30.6	0.0829	-35.6	0.00407	-40.6	0.00723	-45.6	0.000407
-30.7	0.0826	-35.7	0.00402	-40.7	0.00715	-45.7	0.000402
-30.8	0.0823	-35.8	0.00397	-40.8	0.00706	-45.8	0.000397
-30.9	0.0821	-35.9	0.00393	-40.9	0.00698	-45.9	0.000393
-31.0	0.0818	-36.0	0.00388	-41.0	0.00690	-46.0	0.000388
-31.1	0.0816	-36.1	0.00384	-41.1	0.00683	-46.1	0.000384
-31.2	0.0813	-36.2	0.00379	-41.2	0.00675	-46.2	0.000379
-31.3	0.0811	-36.3	0.00375	-41.3	0.00667	-46.3	0.000375
-31.4	0.0809	-36.4	0.00371	-41.4	0.00659	-46.4	0.000371
-31.5	0.0806	-36.5	0.00367	-41.5	0.00652	-46.5	0.000367
-31.6	0.0804	-36.6	0.00362	-41.6	0.00644	-46.6	0.000362
-31.7	0.0801	-36.7	0.00358	-41.7	0.00637	-46.7	0.000358
-31.8	0.0799	-36.8	0.00354	-41.8	0.00630	-46.8	0.000354
-31.9	0.0797	-36.9	0.00350	-41.9	0.00622	-46.9	0.000350
-32.0	0.0795	-37.0	0.00346	-42.0	0.00615	-47.0	0.000346
-32.1	0.0792	-37.1	0.00342	-42.1	0.00608	-47.1	0.000342
-32.2	0.0790	-37.2	0.00338	-42.2	0.00601	-47.2	0.000338
-32.3	0.0788	-37.3	0.00334	-42.3	0.00594	-47.3	0.000334
-32.4	0.0786	-37.4	0.00330	-42.4	0.00588	-47.4	0.000330
-32.5	0.0784	-37.5	0.00327	-42.5	0.00581	-47.5	0.000327
-32.6	0.0782	-37.6	0.00323	-42.6	0.00574	-47.6	0.000323
-32.7	0.0779	-37.7	0.00319	-42.7	0.00568	-47.7	0.000319
-32.8	0.0777	-37.8	0.00316	-42.8	0.00561	-47.8	0.000316
-32.9	0.0775	-37.9	0.00312	-42.9	0.00555	-47.9	0.000312
-33.0	0.0773	-38.0	0.00309	-43.0	0.00548	-48.0	0.000309
-33.1	0.0771	-38.1	0.00305	-43.1	0.00542	-48.1	0.000305
-33.2	0.0769	-38.2	0.00301	-43.2	0.00536	-48.2	0.000301
-33.3	0.0767	-38.3	0.00298	-43.3	0.00530	-48.3	0.000298
-33.4	0.0766	-38.4	0.00295	-43.4	0.00524	-48.4	0.000295
-33.5	0.0764	-38.5	0.00291	-43.5	0.00518	-48.5	0.000291
-33.6	0.0762	-38.6	0.00288	-43.6	0.00512	-48.6	0.000288
-33.7	0.0760	-38.7	0.00285	-43.7	0.00506	-48.7	0.000285
-33.8	0.0758	-38.8	0.00281	-43.8	0.00500	-48.8	0.000281
-33.9	0.0756	-38.9	0.00278	-43.9	0.00494	-48.9	0.000278
-34.0	0.0755	-39.0	0.00275	-44.0	0.00489	-49.0	0.000275
-34.1	0.0753	-39.1	0.00272	-44.1	0.00483	-49.1	0.000272
-34.2	0.0751	-39.2	0.00269	-44.2	0.00478	-49.2	0.000269
-34.3	0.0749	-39.3	0.00266	-44.3	0.00472	-49.3	0.000266
-34.4	0.0748	-39.4	0.00262	-44.4	0.00467	-49.4	0.000262
-34.5	0.0746	-39.5	0.00259	-44.5	0.00461	-49.5	0.000259
-34.6	0.0744	-39.6	0.00256	-44.6	0.00456	-49.6	0.000256
-34.7	0.0743	-39.7	0.00254	-44.7	0.00451	-49.7	0.000254
-34.8	0.0741	-39.8	0.00251	-44.8	0.00446	-49.8	0.000251
-34.9	0.0739	-39.9	0.00248	-44.9	0.00441	-49.9	0.000248
-35.0	0.0738	-40.0	0.00775	-45.0	0.00436	-50.0	0.000245

Relationship of DBM Versus RMS Voltage Across 600 OHMS

(-50.0 to -70.0 DBM)
(0.00845 to 0.000245 Volts)

DBM	VOLTS	DBM	VOLTS	DBM	VOLTS	DBM	VOLTS
-50.0	0.00845	-55.0	0.00436	-60.0	0.000775	-65.0	0.000436
-50.1	0.00842	-55.1	0.00431	-60.1	0.000766	-65.1	0.000431
-50.2	0.00839	-55.2	0.00426	-60.2	0.000757	-65.2	0.000426
-50.3	0.00837	-55.3	0.00421	-60.3	0.000748	-65.3	0.000421
-50.4	0.00834	-55.4	0.00416	-60.4	0.000740	-65.4	0.000416
-50.5	0.00831	-55.5	0.00411	-60.5	0.000731	-65.5	0.000411
-50.6	0.00829	-55.6	0.00407	-60.6	0.000723	-65.6	0.000407
-50.7	0.00826	-55.7	0.00402	-60.7	0.000715	-65.7	0.000402
-50.8	0.00823	-55.8	0.00397	-60.8	0.000706	-65.8	0.000397
-50.9	0.00821	-55.9	0.00393	-60.9	0.000698	-65.9	0.000393
-51.0	0.00818	-56.0	0.00388	-61.0	0.000690	-66.0	0.000388
-51.1	0.00816	-56.1	0.00384	-61.1	0.000683	-66.1	0.000384
-51.2	0.00813	-56.2	0.00379	-61.2	0.000675	-66.2	0.000379
-51.3	0.00811	-56.3	0.00375	-61.3	0.000667	-66.3	0.000375
-51.4	0.00809	-56.4	0.00371	-61.4	0.000659	-66.4	0.000371
-51.5	0.00806	-56.5	0.00367	-61.5	0.000652	-66.5	0.000367
-51.6	0.00804	-56.6	0.00362	-61.6	0.000644	-66.6	0.000362
-51.7	0.00801	-56.7	0.00358	-61.7	0.000637	-66.7	0.000358
-51.8	0.00799	-56.8	0.00354	-61.8	0.000630	-66.8	0.000354
-51.9	0.00797	-56.9	0.00350	-61.9	0.000622	-66.9	0.000350
-52.0	0.00795	-57.0	0.00346	-62.0	0.000615	-67.0	0.000346
-52.1	0.00792	-57.1	0.00342	-62.1	0.000608	-67.1	0.000342
-52.2	0.00790	-57.2	0.00338	-62.2	0.000601	-67.2	0.000338
-52.3	0.00788	-57.3	0.00334	-62.3	0.000594	-67.3	0.000334
-52.4	0.00786	-57.4	0.00330	-62.4	0.000588	-67.4	0.000330
-52.5	0.00784	-57.5	0.00327	-62.5	0.000581	-67.5	0.000327
-52.6	0.00782	-57.6	0.00323	-62.6	0.000574	-67.6	0.000323
-52.7	0.00779	-57.7	0.00319	-62.7	0.000568	-67.7	0.000319
-52.8	0.00777	-57.8	0.00316	-62.8	0.000561	-67.8	0.000316
-52.9	0.00775	-57.9	0.00312	-62.9	0.000555	-67.9	0.000312
-53.0	0.00773	-58.0	0.00309	-63.0	0.000548	-68.0	0.000309
-53.1	0.00771	-58.1	0.00305	-63.1	0.000542	-68.1	0.000305
-53.2	0.00769	-58.2	0.00301	-63.2	0.000536	-68.2	0.000301
-53.3	0.00767	-58.3	0.00298	-63.3	0.000530	-68.3	0.000298
-53.4	0.00766	-58.4	0.00295	-63.4	0.000524	-68.4	0.000295
-53.5	0.00764	-58.5	0.00291	-63.5	0.000518	-68.5	0.000291
-53.6	0.00762	-58.6	0.00288	-63.6	0.000512	-68.6	0.000288
-53.7	0.00760	-58.7	0.00285	-63.7	0.000506	-68.7	0.000285
-53.8	0.00758	-58.8	0.00281	-63.8	0.000500	-68.8	0.000281
-53.9	0.00756	-58.9	0.00278	-63.9	0.000494	-68.9	0.000278
-54.0	0.00755	-59.0	0.00275	-64.0	0.000489	-69.0	0.000275
-54.1	0.00753	-59.1	0.00272	-64.1	0.000483	-69.1	0.000272
-54.2	0.00751	-59.2	0.00269	-64.2	0.000478	-69.2	0.000269
-54.3	0.00749	-59.3	0.00266	-64.3	0.000472	-69.3	0.000266
-54.4	0.00748	-59.4	0.00262	-64.4	0.000467	-69.4	0.000262
-54.5	0.00746	-59.5	0.00259	-64.5	0.000461	-69.5	0.000259
-54.6	0.00744	-59.6	0.00256	-64.6	0.000456	-69.6	0.000256
-54.7	0.00743	-59.7	0.00252	-64.7	0.000451	-69.7	0.000254
-54.8	0.00741	-59.8	0.00251	-64.8	0.000446	-69.8	0.000251
-54.9	0.00739	-59.9	0.00248	-64.9	0.000441	-69.9	0.000248
-55.0	0.00738	-60.0	0.00775	-65.0	0.000436	-70.0	0.000245

Relationship of DBM Versus RMS Voltage Across 600 OHMS

(-70.0 to -90.0 DBM)
(0.000245 to 0.000025 Volts)

DBM	VOLTS	DBM	VOLTS	DBM	VOLTS	DBM	VOLTS
-70.0	0.000245	-75.0	0.000138	-80.0	0.0000775	-85.0	0.0000436
-70.1	0.000242	-75.1	0.000136	-80.1	0.0000766	-85.1	0.0000431
-70.2	0.000239	-75.2	0.000135	-80.2	0.0000757	-85.2	0.0000426
-70.3	0.000237	-75.3	0.000133	-80.3	0.0000748	-85.3	0.0000421
-70.4	0.000234	-75.4	0.000132	-80.4	0.0000740	-85.4	0.0000416
-70.5	0.000231	-75.5	0.000130	-80.5	0.0000731	-85.5	0.0000411
-70.6	0.000229	-75.6	0.000129	-80.6	0.0000723	-85.6	0.0000407
-70.7	0.000226	-75.7	0.000127	-80.7	0.0000715	-85.7	0.0000402
-70.8	0.000223	-75.8	0.000126	-80.8	0.0000706	-85.8	0.0000397
-70.9	0.000221	-75.9	0.000124	-80.9	0.0000698	-85.9	0.0000393
-71.0	0.000218	-76.0	0.000123	-81.0	0.0000690	-86.0	0.0000388
-71.1	0.000216	-76.1	0.000121	-81.1	0.0000683	-86.1	0.0000384
-71.2	0.000213	-76.2	0.000120	-81.2	0.0000675	-86.2	0.0000378
-71.3	0.000211	-76.3	0.000119	-81.3	0.0000667	-86.3	0.0000371
-71.4	0.000209	-76.4	0.000117	-81.4	0.0000659	-86.4	0.0000371
-71.5	0.000206	-76.5	0.000116	-81.5	0.0000652	-86.5	0.0000367
-71.6	0.000204	-76.6	0.000115	-81.6	0.0000644	-86.6	0.0000362
-71.7	0.000201	-76.7	0.000113	-81.7	0.0000637	-86.7	0.0000358
-71.8	0.000199	-76.8	0.000112	-81.8	0.0000630	-86.8	0.0000354
-71.9	0.000197	-76.9	0.000111	-81.9	0.0000622	-86.9	0.0000350
-72.0	0.000195	-77.0	0.000109	-82.0	0.0000615	-87.0	0.0000346
-72.1	0.000192	-77.1	0.000108	-82.1	0.0000608	-87.1	0.0000342
-72.2	0.000190	-77.2	0.000107	-82.2	0.0000601

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open wire carriers of particular interest to the small Independent company have their higher numbered channels in the hundreds of kilocycles, some well above 300 kilocycles. Almost all have some channels assigned between these extremes.

Several non-coaxial cable carriers in pilot production will allocate channels even higher. Normally, however, the loss of cable to be superimposed with carrier is *not* measured between 600 ohms. An impedance conversion is necessary at both oscillator and load.

Our digression into a discussion of the frequency spectrum is partly to point up the fact that "pure" resistor belongs to the text books. Every resistor has, in itself, some frequency characteristic; that is, it changes its value in ohms and even acquires a reactive component as frequency changes. We are interested in resistors that have a negligible change in the frequency range of interest. Fortunately, they *are* easy to come by. Most ordinary carbon resistors purchased at a radio shop will do the job if their dc ohmic value is right. But wire-wound resistors are not suitable. The load resistor should be checked with a dc Wheatstone Bridge to be between 594 and 606 ohms. Since we normally talk of milliwatts in the insertion loss business, any wattage rating from ¼ watt on up is acceptable.

AC Voltmeter Characteristics

It is possible to use non-vacuum tube or non-transistorized ac volt-ohmmeter, or "VOM" types, for insertion loss measurements, if three conditions are met:

(1) The frequency range of the instrument is not exceeded.
(2) The sensitivity (ohms per volt) of the instrument is high enough.
(3) The accuracy tolerance is equal to that needed for an AC-VTVM (discussed below) within the assigned range of the first two conditions.

Unfortunately, VOM's usually are found unsuited to insertion loss measurements, due to not meeting one or more of the three requirements above. We would expect the VOM to keep doing the general-purpose yeoman's work around telephone plant it always has done so well; but, for this job, we would need a specialist.

Vacuum tube or transistorized type ac voltmeters (AC-VTVM's) are characterized by very high input resistance, wide frequency range and extreme sensitivity. We are *not* talking about electronic instruments, which also measure dc volts and ohms, as well as ac volts. Again, they have their applications; but they are not sensitive enough. A voice pass filter, such as used in subscriber carrier applications, may have an insertion loss of 50 db, or more at 100 kilocycles and would, thus, make accurate measurements with such instruments impossible. We will see that, under normal measurement procedures, this will lead to the necessity of an AC-VTVM which can read in the range of 0.00245 volts accurately *(Table I)*. The "combination" electronic voltmeters cannot do this. Our AC-VTVM should perform about as follows:

Frequency Range
20 cps to 500 KC/S, min.

Full Scale Deflection Range
0.001 to 100 volts, min.

Input Resistance
10 megohms, min.

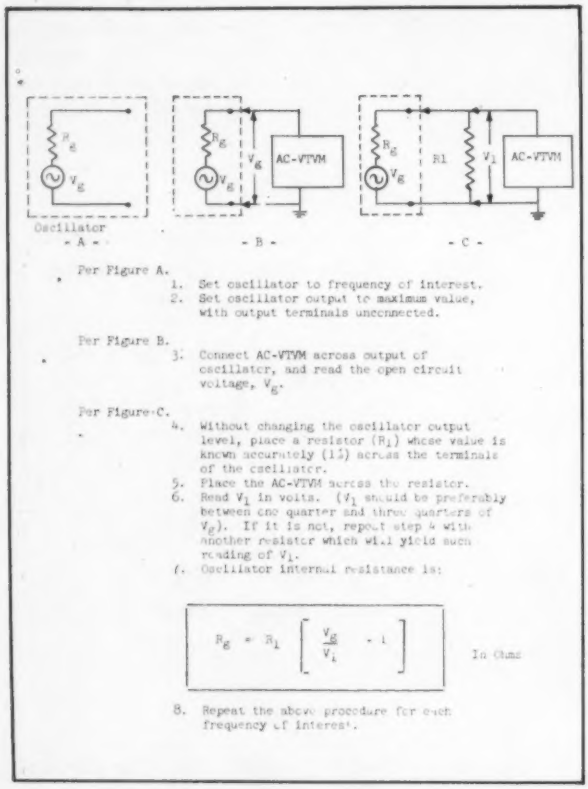
Oscillator
- A -
AC-VTVM
- B -
R1
AC-VTVM
- C -
Per Figure A.
1. Set oscillator to frequency of interest.
2. Set oscillator output to maximum value, with output terminals unconnected.
Per Figure B.
3. Connect AC-VTVM across output of oscillator, and read the open circuit voltage, V_g.
Per Figure C.
4. Without changing the oscillator output level, place a resistor (R_1) whose value is known accurately (1%) across the terminals of the oscillator.
5. Place the AC-VTVM across the resistor.
6. Read V_1 in volts. (V_1 should be preferably between one quarter and three quarters of V_g). If it is not, repeat step 4 with another resistor which will yield such reading of V_1.
7. Oscillator internal resistance is:
$R_g = R_1 \left[\frac{V_g}{V_1} - 1 \right]$ In Ohms
8. Repeat the above procedure for each frequency of interest.

Fig. 1. Method of measuring oscillator internal resistance.

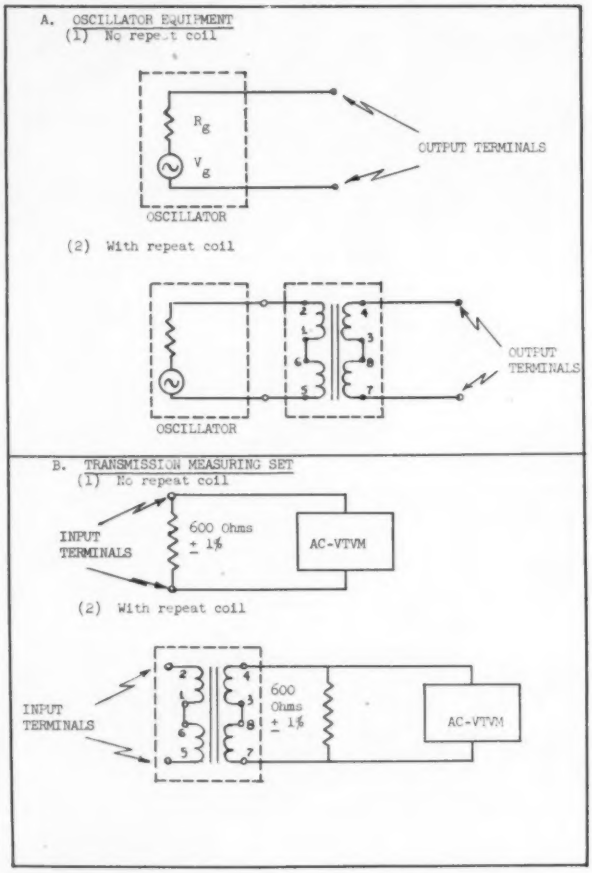

Fig. 2. Examples of "oscillator equipment" and "transmission measuring set."

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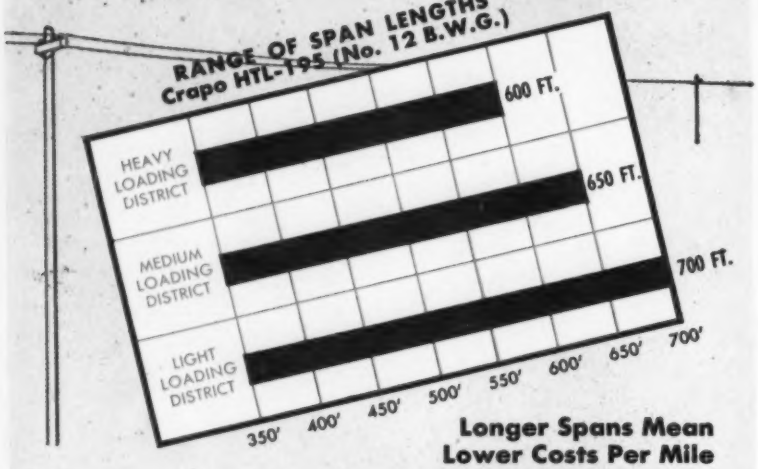

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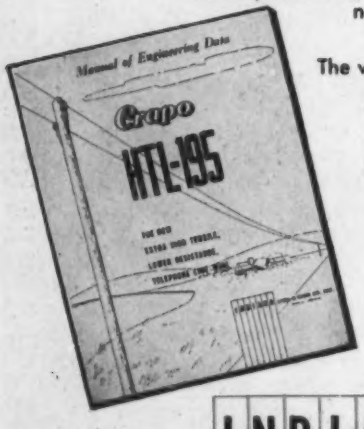
You can cut the number of pole structures to a minimum when you use Crapo HTL-195 in building rural telephone lines. Extra long span construction, made possible by the high physical strength of this new wire, means marked savings in material and installation costs.



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The Hewlett-Packard 400D AC-VTVM and the Fischer Research Laboratory ac millivoltmeter seem to be good for insertion loss measurements; undoubtedly there are others that are good. Where there are serious noise or extraneous signals in the facility being measured, the use of ordinary AC-VTVM's may need to be limited to calibration of oscillator output level, as we shall see.

The terminals of most AC-VTVM's are unbalanced (do not have about the same impedance to ground), and repeat coils must therefore be used when measuring balanced equipment or facilities.

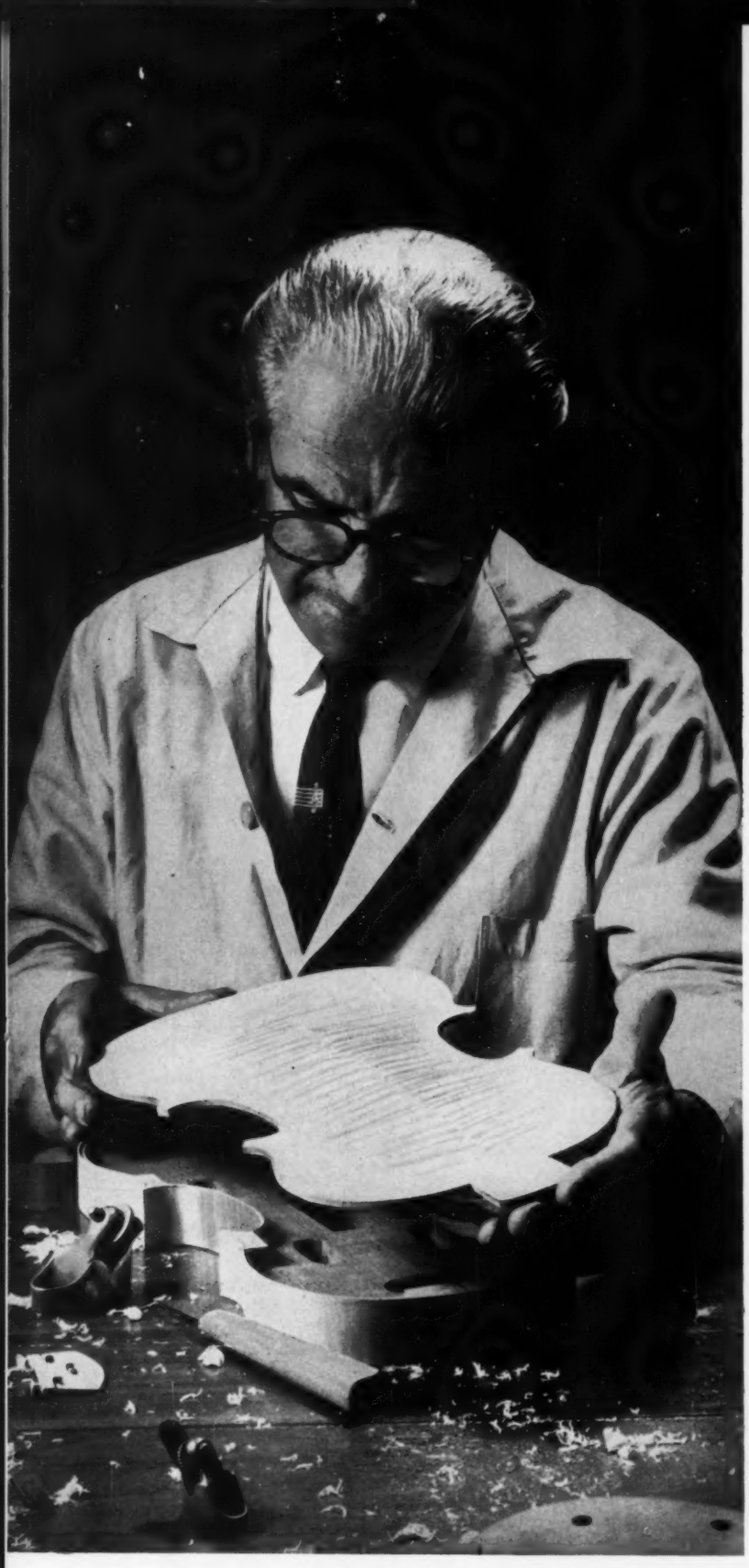
Oscillator Characteristics

Although various models have appeared over the years, there are only a few types of oscillators marketed today having the proper characteristics for measurement of insertion loss between 600 ohms. This is no place for setting forth a detailed oscillator specification, but if we keep in mind what we are trying to do, it will be seen that the following characteristics are just about essential:

Accuracy
2 per cent max.
Frequency Distortion
0.5 per cent max.
Frequency Response
± 1 db.
Frequency Range
20 cps to 500 KC/S
Open Circuit Voltage
15 volts min.
Internal Impedance
570 to 630 ohms resistive at all output levels and all frequencies at which oscillator is designed to operate.

It is on the last requirement that many otherwise acceptable oscillators stub their toe. We can only repeat good advice: Buy your oscillator from a reliable supplier familiar with telephone plant needs. We use the Hewlett-Packard Model 200CD oscillator, and have found it satisfactory for insertion loss measurements.

What should be done if there is an oscillator on hand about which internal resistance is not known? Fortunately, this is one characteristic which is easily uncovered if—like a lot of other things—you have the right tools. In this case only two tools are needed: A fixed carbon load resistor and an AC-VTVM. The load resistance should be known within 1 per cent. The value itself can be anywhere in the 500-700-



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ohm range. The voltmeter should be an AC-VTVM of a type already described. The method is outlined in *Fig. 1. Fig.* 1 assumes the oscillator internal impedance is primarily resistive; due to the nature of oscillator output circuits this seems to be justified.

If the oscillator on hand is found not to have an internal resistance between 570 and 630 ohms, it is possible that it still may be used for insertion loss measurements around 600 ohms. However, external corrective networks or a constant monitoring of generated voltage at the oscillator terminals will be necessary. This probably can be handled OK in the laboratory; however, attending to these additional worries during field measurements, when conditions usually become something less than ideal even with good instruments, has sometimes been found to lead to measurement errors which make doctoring-up procedures on wrong-impedance oscillators undesirable. For those who would like to look into them, information on such procedures is available in the REA Telephone Engineering and Construction Manual Section 407, which can be obtained from the Rural Electrification Administration, Washington 25, D. C.

Oscillators meeting the necessary requirements above and having a *balanced* pair of output terminals at all output levels are expensive. If an unbalanced but otherwise satisfactory oscillator is employed to measure a balanced circuit, a repeating coil should be employed.

Repeating Coil Characteristics

Repeating coils are usually employed for the following reasons:

(1) To measure a balanced circuit with unbalanced test equipment without disturbing the ac characteristics of the balanced circuit.
(2) To isolate direct currents in one or both circuits between which the repeat coil connects without disturbing the ac transformation.
(3) To match impedances between circuits.

The insertion loss of the repeat coil itself should be not over 0.5 db (when terminated in its proper impedance ratio) within its rated frequency range. For voice frequency repeat coils, this should hold whether dc is flowing in the coils or not. Most measurements we will cover here will call for 1:1 turn ratios. An example in the voice frequency range is the Western Electric (WE) 120H repeating coil. In the 1 to 400 kc/s frequency range, a Lynch Carrier Systems, Inc., 2624 repeat coil is suitable. This latter can be strapped for 600/600, 600/150 or 600/135 ohms.

Examples of components or facilities which require connection to repeat coils during insertion loss measurements are: Cable or open wire pairs; "carrier line," "C.O. line" or "subscriber line" terminals of carrier equipment; carrier line filters not already equipped with repeating coils; voice repeaters; and central office links or trunk circuits.

A good rule is to use, when in doubt, the proper repeating coils. They cannot hurt measurement results, even if not needed.

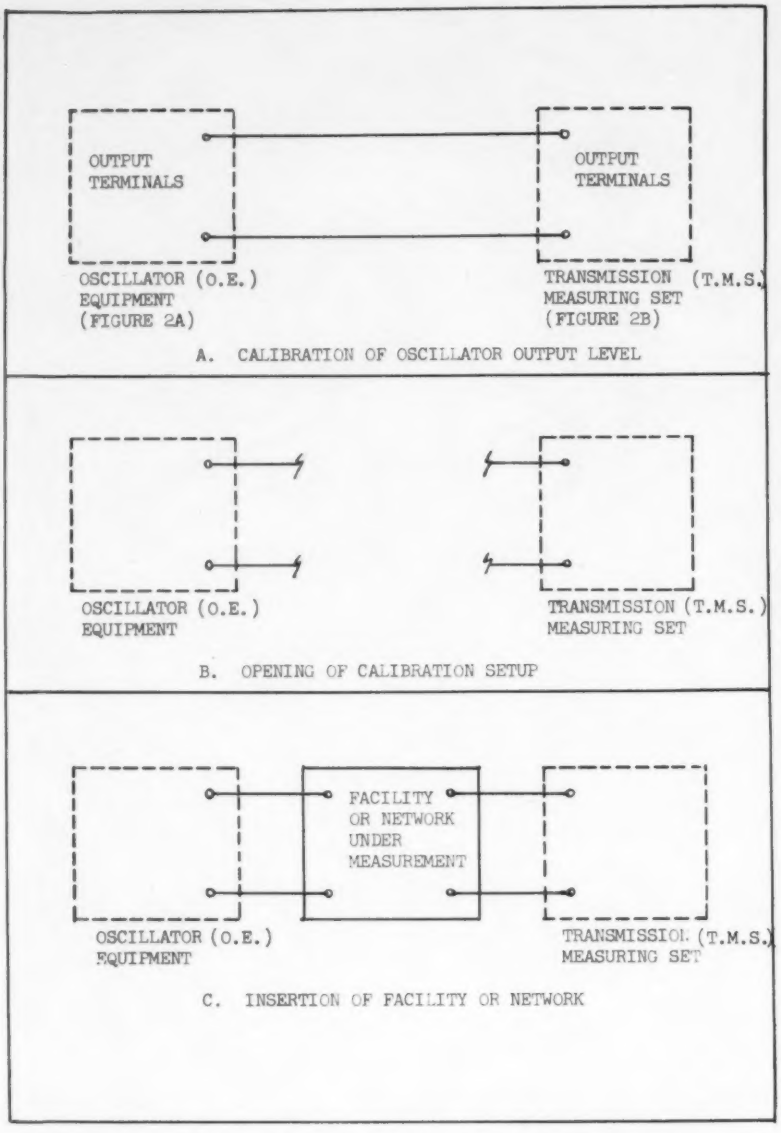
OUTPUT TERMINALS
OUTPUT TERMINALS
OSCILLATOR (O.E.) EQUIPMENT (FIGURE 2A)
TRANSMISSION (T.M.S.) MEASURING SET (FIGURE 2B)
A. CALIBRATION OF OSCILLATOR OUTPUT LEVEL
OSCILLATOR (O.E.) EQUIPMENT
TRANSMISSION (T.M.S.) MEASURING SET
B. OPENING OF CALIBRATION SETUP
FACILITY OR NETWORK UNDER MEASUREMENT
OSCILLATOR (O.E.) EQUIPMENT
TRANSMISSION (T.M.S.) MEASURING SET
C. INSERTION OF FACILITY OR NETWORK

Fig. 3. Fundamental procedure for insertion loss measurements.

Noise in Facility Being Measured

Before discussing the effect of normal noise induction on insertion loss measurements, it should be remembered that many types of outside plant troubles—opens, shorts, split pairs, crosses, leaks, etc.—will make a pair extra noisy. Even if it does not make the pair inoperable, a trouble will probably lead to poor measurement results; any resemblance between the measured insertion loss on a pair suffering from poor housekeeping and what the loss would be if the pair were spic-and-span is purely coincidental.

Assuming no troubles, however, it is still true that every open wire or cable pair has some noise voltage induced between the two wires. As a matter of fact, we generally cannot look forward to success in measuring the insertion loss of any significant length of *open wire* with the instrumentation thus far described because the voltage induced

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Designed by Graybar

HALLAMORE

Examples of "Transmission Improvement" Possible with Application of E-type Repeaters

THE term "transmission improvement" is on the tongue of many telephone engineers these days. In order to furnish proper standards of service over subscriber's loops, extended area trunks, and toll connecting trunks, the industry is frequently having to "do something about it." The solution is often the application of Hallamore E2 and E3 repeaters. Most thoroughly field proven, absolutely stable, and capable of maintaining constant gain-frequency characteristics; these units offer important advantages over other types of negative impedance repeaters.

Typical gains possible with E-type repeaters are as follows: A. One E2 repeater, operating alone, makes it possible to reduce circuit loss to about one-half the non-repeatered value on regularly loaded or non-loaded circuits. Located at or near the loss center of the circuit, one E2 repeater can provide a maximum gain of 8 db. Located at either terminal, a lone E2 can achieve a gain of 6 db.

Note: To avoid echo problems on toll-connecting trunks operating at VNL +2, the E2 repeater must be used in association with an E3. Use of the E2 alone should be confined to extended area trunks.

B. By utilizing an E2-E3 combination, the circuit loss of properly loaded facilities may be reduced by approximately 85% of the non-repeatered value. Located at or near the loss center of the circuit, an E2-E3 combination will provide a maximum gain of approximately 12 db. Located at either terminal, the E2-E3 combination can achieve a gain of 8 db.

More than one E2 or E2-E3 combination repeater may be used on a circuit, or at the same office on different circuits that may be switched together.

at 60 cycles and its harmonics will obscure results. We will discuss other instrumentation to handle situations where noise or other extraneous signals are in the circuit that is to be measured.

The situation is not as bleak for measurements of cable lengths that are not too long electrically, say having a loss of 15 db or less. There are exceptions, but usually the frequent transpositions or twists in a cable pair (every few inches) and the existence of a shield tend to keep unwanted induction down. This boils down to saying that we can measure most pairs entirely in cable for voice frequency loss (loaded or non-loaded) but carrier frequency loss measurements will usually require other instruments in addition to those covered so far.

Calibration of Oscillator Output Level

In order not to repeatedly go over details of instruments and components already covered, let us use the ground rules that by "Oscillator Equipment" (O.E.), we mean either of the combinations in *Fig. 2A;* by "Transmission Measuring Set" (TMS), we mean either of the combinations of equipment in *Fig. 2B.* The choice between each of the combinations in *Fig. 2A* and *2B* depends on whether we intend to use repeat coils to isolate the unbalanced equipment from balanced circuits. It may be pointed out here that the equipment included in the Transmission Measuring Set shown in *Fig. 2A(2)* is available in one package for some frequency ranges. An example is the WE 13A transmission measuring set in the voice frequency range. This instrument, by the way, happens to have its meter indicating db's above or below one milliwatt in 600 ohms or in DBM, rather than volts across 600 ohms, but with *Table I* there should be no difficulty in readily translating between these two languages.

The oscillator equipment output is calibrated with a transmission measuring set before every measurement. To calibrate:

(1) Connect oscillator equipment "output terminals" to transmission measuring set "input terminals" as in *Fig. 3A.*

(2) Set the oscillator to the frequency at which it is desired to make a measurement.

(3) Vary oscillator output level control to register the desired reference level in DBM or volts across the 600-ohm resistor (0.775 volts across the 600-ohm resistor for 0 DBM reference level).

(4) The oscillator equipment is now calibrated to measure insertion loss in db between a 600-ohm source and load.

(5) *Do not change* oscillator output control until measurement at this frequency is completed.

Measurements on Equipment or Facilities Not Having Unwanted Signals. Now that we have finished discussing what types of instruments we should use—at least for situations where there are not unwanted signals comparable with that which we are trying to measure—and are able to calibrate with them, we can be quite specific about how to make an insertion loss measurement. Refer to *Fig. 3. Fig. 3A* has already been discussed. After calibration there are but three additional steps (following step (5) above):

(6) Disconnect the oscillator equipment from the transmission measuring set *(Figure 3B).*

(7) Connect the "unknown" facility or equipment between them *(Fig. 3C).*

(8) Read the meter on the AC-VTVM in DBM.

The reading in (8) is numerically equal to the insertion loss or gain in db. If the reading in (8) is minus, it is insertion *loss* in db; if plus, it is insertion *gain* in db. In *Fig. 3C* the unknown is shown as a four terminal network, but it need not be. A measurement taken with a two-terminal network between the top terminals of the oscillator equipment and transmission measuring set with the bottom terminals strapped together will give legitimate results; so will a measurement with top terminals strapped together, bottom terminals strapped together and

(Please turn to page 102)

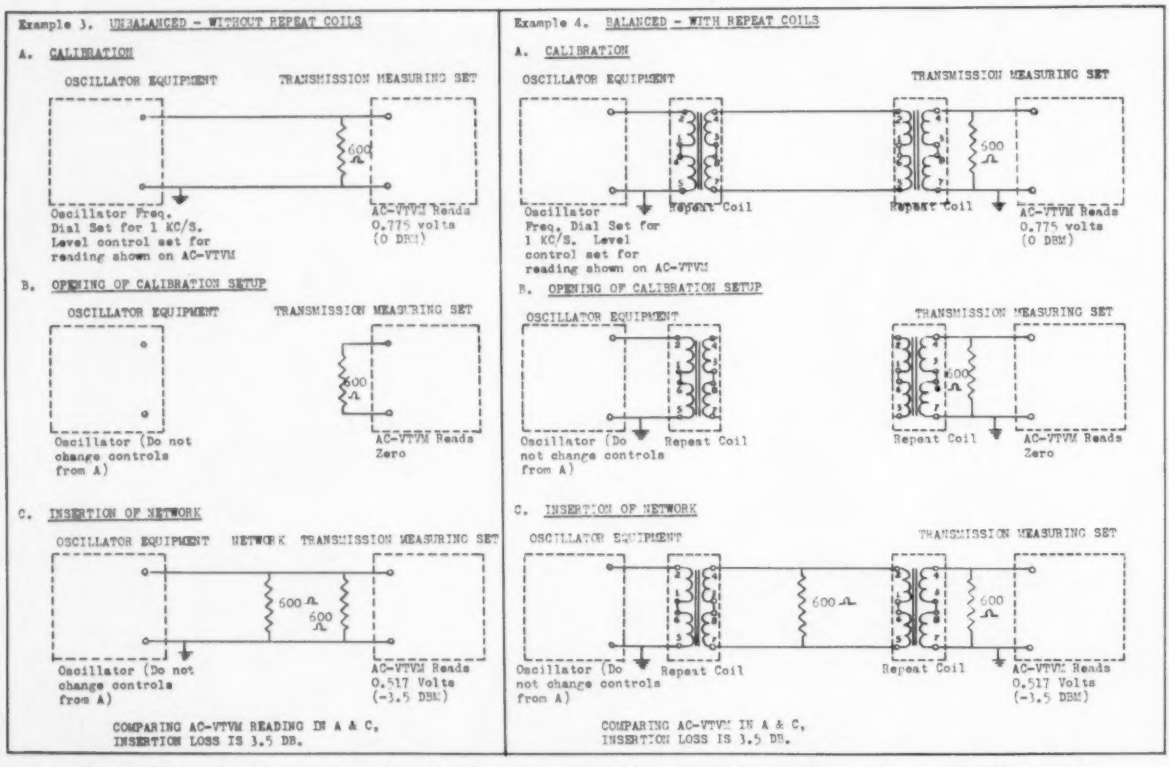
Example 3. UNBALANCED - WITHOUT REPEAT COILS
A. CALIBRATION
OSCILLATOR EQUIPMENT
TRANSMISSION MEASURING SET
600
Oscillator Freq. Dial Set for 1 KC/S. Level control set for reading shown on AC-VTVM
AC-VTVM Reads 0.775 volts (0 DBM)
B. OPENING OF CALIBRATION SETUP
OSCILLATOR EQUIPMENT
TRANSMISSION MEASURING SET
600
Oscillator (Do not change controls from A)
AC-VTVM Reads Zero
C. INSERTION OF NETWORK
OSCILLATOR EQUIPMENT
NETWORK
TRANSMISSION MEASURING SET
600 Ω
600 Ω
Oscillator (Do not change controls from A)
AC-VTVM Reads 0.517 Volts (-3.5 DBM)
COMPARING AC-VTVM READING IN A & C, INSERTION LOSS IS 3.5 DB.
Example 4. BALANCED - WITH REPEAT COILS
A. CALIBRATION
OSCILLATOR EQUIPMENT
TRANSMISSION MEASURING SET
600
Oscillator Freq. Dial Set for 1 KC/S. Level control set for reading shown on AC-VTVM
Repeat Coil
Repeat Coil
AC-VTVM Reads 0.775 volts (0 DBM)
B. OPENING OF CALIBRATION SETUP
OSCILLATOR EQUIPMENT
TRANSMISSION MEASURING SET
600
Oscillator (Do not change controls from A)
Repeat Coil
Repeat Coil
AC-VTVM Reads Zero
C. INSERTION OF NETWORK
OSCILLATOR EQUIPMENT
TRANSMISSION MEASURING SET
600 Ω
600 Ω
Oscillator (Do not change controls from A)
Repeat Coil
Repeat Coil
AC-VTVM Reads 0.517 Volts (-3.5 DBM)
COMPARING AC-VTVM IN A & C, INSERTION LOSS IS 3.5 DB.

Fig. 4. Examples of measuring insertion loss due to bridging a 600-ohm resistor across a 600-ohm circuit.

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Underground Service Wire (Direct Burial)
Tree Wire
Underground Distribution and Service Wire (Direct Burial)

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Ground Wires
Inside-Outside Station Wire
Inside Station Wire
Underground Distribution and Service Wire (Direct Burial)
Underground (B) Service Wire (Direct Buried Drop Wire)

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"INFORMATION"—The Poser

Anything that can be done to reduce the cost of rendering this service will contribute greatly to a company's economic future

By GILBERT R. BRACKETT

THE SHORT synopsis by Ray Blain in the June issue of TELEPHONY, reporting an article published in the *Bell Laboratories' Record*, entitled "The Information Problem," is appropriate and should be read and given careful consideration by all operating telephone companies. Every telephone office in the country, from the smallest CDO to the multi-office arrangements in the large cities, is affected by the volume of information calls that deluge them.

Many of us can recall the days of a few decades ago when there was no service charge for moving a telephone. Mrs. Housewife used to call for an installer to change her telephone from one side of the room to the other as often as she rearranged the furniture in the room that housed the set.

As the number of subscribers increased, during the years that followed, so did the demands for this free service. Moving telephones became a major portion of an installer's daily chores. The costs skyrocketed and became prohibitive. In desperation the telephone companies sought relief in a nominal surcharge for the moving of any telephone.

Fortunately, the public understood why the surcharge was necessary and gave the telephone industry its approval. The affect on instrument moves seemed almost magical. Orders dropped to a low level not anticipated by the most optimistic. Mrs. Housewife gave more serious thought to a permanent location for her telephone when it was first installed and everybody was happy.

Also, there was a time when the telephone directory had little use except in the larger cities. Miss Susie Operator knew everybody in town. A call for subscriber Jim Wilson was enough information for the young lady. She knew the whereabouts of Jim, too, and could locate him for the calling party even though he was not at his usual place of business. Sometimes Jim had a namesake, but that did not confuse Susie. The question, "Does he run the livery barn or the grocery store?" usually brought the information needed and soon the correct Jim was on the line.

Information Costs High

But, as new people moved into town, Susie's memory calculator could not expand fast enough to retain the growing mass of new names and the directory came into its own, and Susie steadied down to regular operating.

As was brought out in Mr. Blain's column, the transition from the heyday of Operator Susie to the present time has ballooned a minor problem into a near stalemate.

If the Bell annual cost for Information service is over 100 million dollars, the Independent companies must be suffering with almost proportionate acuteness.

As Mr. Blain's column also explained, there is no panacea for our Information problem. It is with us to stay and it will continue to grow in intensity as the number of subscribers increase. It is a problem that is taxing the best minds in the industry in an effort to find a logical answer.

We may assume that approximately 2.5 per cent of all originating calls will end up at the Information positions. We may also assume that each call which is handled by Information costs the company approximately 4.5 cents. In other words, an Information bureau that receives but 1,000 calls a day costs the telephone company $45, which adds up to a healthy $16,425 annual cost, a very tidy expenditure for a free service. Anything that can be done to reduce this cost of giving this service is an important contribution to a telephone company's economic future.

Effect on Directory Advertisers

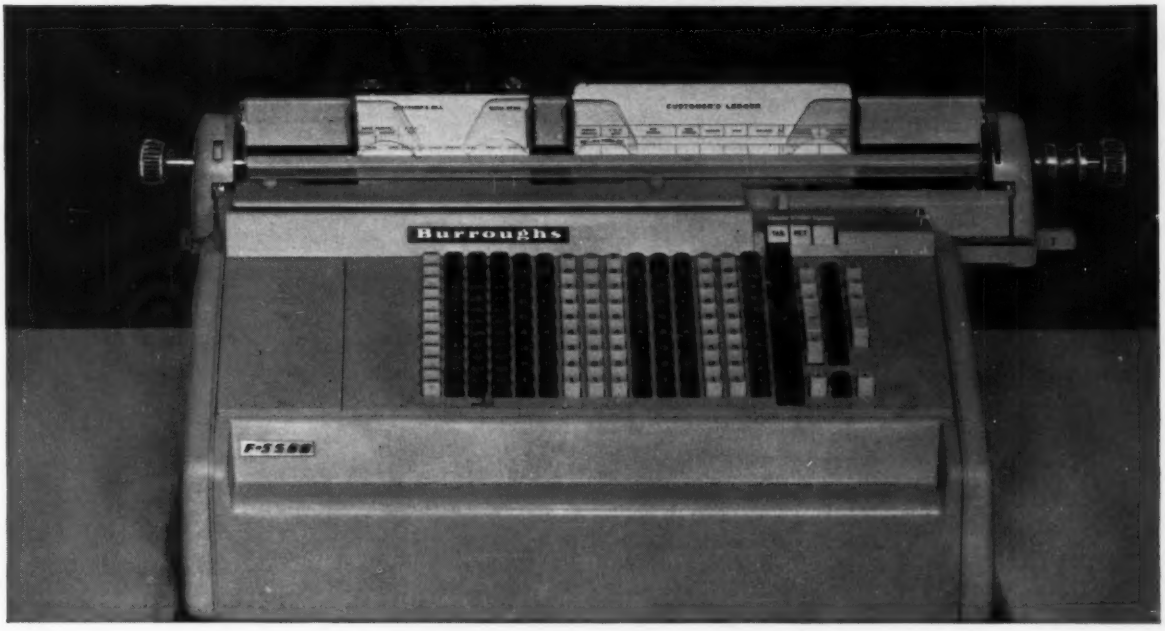
We can thank our lucky stars that Information costs are partially compensated for by the revenue derived from the special listings in the body of the directory and the advertising in the yellow pages. But, even here, we are losing revenue. The more our customers bypass the directory and go direct to Information, the less value our directory is to the advertiser, and the less likely he will be to subscribe to an advertisement in the Yellow Pages. Already we hear faint rumblings from our directory customers. "Are they getting full value for the advertising money they spend with us?" These rumblings must be throttled before they accelerate into something that can really embarrass us.

Every telephone employe must do his or her part. An installer who visits a customer can pass out a small household "frequently called number booklet" and explain the importance of its use. A repairman on a case of trouble should check to discover whether the customer

(Please turn to page 78)

NEW BURROUGHS F-5000 FIRST FULLY AUTOMATIC ACCOUNTING MACHINE WITH DUAL PRINTING

NEW BURROUGHS F-5000 FIRST FULLY AUTOMATIC ACCOUNTING MACHINE WITH DUAL PRINTING



Now dual printing is combined with fully automatic accounting! With Burroughs new smartly styled F-5000 Dual Printing Accounting Machine, there are no extra operator decisions to make and no extra keys to punch. The machine prints identical figures—simultaneously—on two original records. Balances are automatic without key depression. And you get far greater flexibility to help you handle more accounting jobs faster. Here's why:

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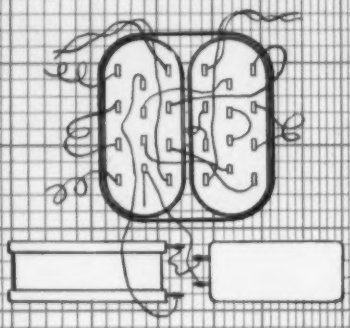

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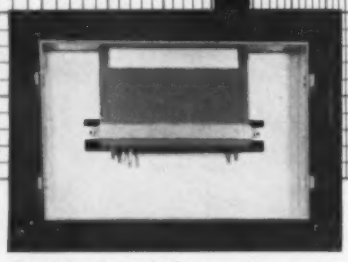

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Spiraflex HANDSET CORDS in bright colors with non-staining thermoplastic jackets in solid color extrusions matching color shade and sheen of telephone sets. Also non-staining black Neoprene jacketed cords. Both types available with or without integral moldings and terminations. Furnished in standard or extra long lengths.

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is keeping the directory up-to-date. If he should find it soiled or dog-eared he should supply the customer with a new one, he, in turn, explaining the importance of its use. In addition to the household directory, the housewife may be given a small, attractive address-like booklet that will fit in her purse. This will allow her to make a list of emergency numbers which she might have to call when away from home.

PBX Number Lists

In some cities, the small PBX toll user is provided with a loose-leaf, indexed, imitation leather frequently called number booklet. And, if so requested, the telephone company obtains and types the out-of-town list of telephone numbers the customer calls often and returns the completed booklet to him.

Should the reference call for approximately 200 listings, the telephone company equips the PBX switchboard with plastic keyshelf bulletin holders and assists the customer in compiling the Information data.

In the case of larger reference requirements, a keyshelf "flip-flop" directory unit that will hold 1,360 listings is installed. Such a unit requires 3¼ inches by 8½ inches of keyshelf space and has a bridge-type base which allows it to be placed astride the separating strip between positions. In extreme situations, the larger swing-type directory unit with a capacity up to 6,900 listings is possible.

Generally these directory units are furnished by the telephone company at no cost to the customer. But, the customer does maintain it, once it is put into service. In practically every case, once installed, a directory has proven to be worth its cost many times over. They save many calls to Information and much circuit time if a toll call is involved.

Worth Their Costs

Furnishing directory equipment to PBX customers may sound like a costly procedure. It does cost money, perhaps in some cases quite a bit. But, when we consider that if these PBX customers, who place over 50 per cent of all calls in a city, were to cut down the Information work-load only 1 per cent annually, a savings of over one million dollars could result. That amount of savings could buy a great deal of directory equipment. Add to this the toll circuit time saved and it could very well double the over-all net savings.

Our operators, our accountants, our building people, every telephone employe from top management to the lowest echelon, can and should do their bit toward lowering the volume of Information calls. There are many, many ways in which this can be done. We all have friends and these friends know we are members of the greatest family in the world, the telephone family. Let us talk our problems over with these friends. Tell them about information and how they can help you when they call by number, even though you may not be an Information operator.

I recall visiting friends one evening for a few rubbers of bridge. There were 12 in the party. One of the group sitting at our table spoke of the trouble she had had that morning when she tried to call a friend by telephone.

"I thought I knew the number," she explained, "but I guess my memory isn't what it use to be. I got a wrong party twice. I was sure the number was either Cherry 9-7467 or Cherry 9-4762. In desperation I called Information and she gave the number as Cherry 9-7426."

"Why didn't you look the number up in the directory?" I queried.

"Oh, that's such a bother. It's much easier to call Information," she grinned. "I keep the directory in the desk. I can get the number from Information quicker than I can find the directory."

I took a few minutes from the game and explained a little about information.

"That call to information cost the telephone company 4½ cents," I told her.

"Which won't cause the telephone company to go bankrupt," she giggled.

"That is true," I admitted, "but in this city the information operators handle an aggregate of more than 6,000 calls every day. Multiply that by 4½ cents and you can see the costs of a service that the telephone company gives their customers free. It is considerable, believe me."

DDD Will Increase Problem

I then switched to Direct Distance Dialing (DDD) and spoke of the inconvenience and expense such thoughtlessness would cause when the DDD system became fully operative. I explained the terrific job it was to prepare and compile a directory, and the burden that was placed upon the operators when subscribers asked for numbers that were listed in the directory. I mentioned the weight of the directory in the larger cities and the fatigue it brought to the operators who lifted them many times each day. I also spoke of the search time for Information calls which ranges from a few seconds to several minutes for the harder to find information. Before I was through all three tables were listening intently. I made a few more short statements, answered a number of questions and signed off.

I was surprised several days later when I met my "bridge" friend on the street. "What do you know," she greeted me, "I find looking up a telephone number in the directory a lot of fun and it saves time. I keep my directory handy to my telephone now," she smiled.

Business men's group meetings, club women's assemblies, schools, and many other get-togethers, offer a wonderful opportunity to sell our public on our Information problem. I feel sure they will cooperate with us as they have in the past, should we ask their help in ironing out a difficulty which they themselves are responsible for.

Drastic Steps Needed

If, in the case of a request for a number that is listed in the directory, would the Information operator be out of line if she asked the caller the date of his directory? If it was a current issue, would it be discourteous to suggest that the caller refer to the directory for the number he desires? Perhaps a little drastic, but some drastic steps must be taken if we are to cut down on Information costs. We took a drastic step when a charge was made for moving a telephone, but the customer saw the light and today offers no criticism of the charge. If our customers fully understand our Information problem, if we go all out to see that they are told what is wrong and how they can help us, they gladly will cooperate. The average customer is a good Joe, he likes to help the underdog.

Why not clean our own house? Hold meetings with representatives from every department and from every job level. In such meetings, ways and means of slowing down this Information avalanche can be discussed. Out of such conferences will come many good ideas, which, when developed, should help stem this increasing tide of Information traffic.

When customer toll dialing becomes of age, information will be plagued by a new menace. Requests for telephone numbers will descend upon us from all points of the compass and add to the back-breaking load the Information people are already carrying. If we start planning now, perhaps we can head off many of the curiosity calls that are inherent in any new service we develop.

Gives Newspaper Directories

I recall a case of a newspaper whose monthly toll bill was of tremendous size. Reporters called distant cities to confirm reports on incidents that involved national, as well as locally, known people. These reporters could not know the telephone numbers, sometimes not even the names. They usually called by address. The data passed on to the Information operator was vague and

(Please turn to page 132)

201—famous Klein Side Cutting Plier. Sizes 5, 6, 7, 8 and 9 in.

201-NE—rounded nose side cutting plier. Sizes 5, 6, 7, 8 and 9 in.

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301—long nose plier. Available in 5-, 6- and 7-in. sizes. Also may be had with cutters.

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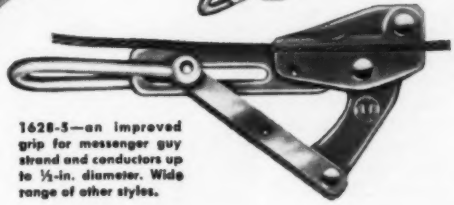

1628-5—an improved grip for messenger guy strand and conductors up to ½-in. diameter. Wide range of other styles.

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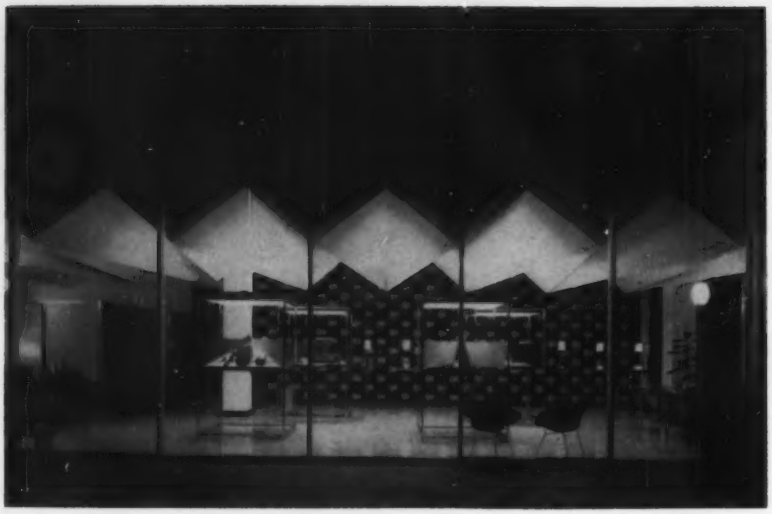

Overlooking a main entrance to the Southdale Shopping Center, Northwestern Bell's telephone shop is on full display even from the outside. A glass wall and unusual lighting combine to provide this impressive panorama. The "folded plate" ceiling and the light floor serve to frame the telephone mural and colorful product displays. The shop's manager has the desk at the far right, with a customer's room, home planning center and foreign directory library partially visible at the left.

Sales Shop Without Precedent Poses Design Challenge

DESIGN a shop without precedent whose purpose is to merchandise a product that has not been marketed in the traditional manner. This was the challenge issued recently to a firm of Minneapolis (Minn.) architects.

The product is the telephone, and the shop was to be the first of its kind in a major metropolitan center.

For some time the Minnesota area of Northwestern Bell Telephone Co. had been seeking an opportunity to combine an aggressive approach to the sale of residential services with a test of de-centralized business office operation. When suitable rental space became available late last year in the 20 million dollar Southdale Regional Shopping Center in suburban Minneapolis, the company found its opportunity.

In this experiment in aggressive telephone merchandising, the architectural firm of David J. Griswold & Associates was given a free hand. Architects of proven experience in modern store design (three other Southdale stores were done by the firm), they expressed in the telephone shop the latest in merchandising ideas.

Chief concern of Griswold was to create a design so stunning that it would attract attention and draw shoppers inside where consultants could interest them in telephone products and services.

Although the shop overlooks a main entrance and parking area, it does not face the concourse like the 70-some other stores in the indoor center. But with 110,000 shoppers moving through Southdale every week, the architect was assured of sufficient prospects for the telephone shop, and he set out to "magnetize it."

Glass—56 feet of it—was used for the entire exterior wall to provide an attractive panorama of the interior. This light and airy effect was coupled with unique ceiling treatment—a "folded plate" independent of the structural ceiling. This floating acoustical plaster ceiling resembles inverted pyramids. Dark above and lighted below, it contributes to the "come-and-investigate" effect. The shop's upper level location also helps, in that it is visible for a considerable distance.

Inside—where design is intended to arrest the shopper and kindle his interest in the product—the telephone is used to maximum advantage in a striking mural of 263 ivory telephones. Mounted on a black 12 by 50-foot wall,

There's no mistaking the purpose of Northwestern Bell's sales shop. A mural of 263 telephones and the attractive displays—set in stunningly modern surroundings—serve to emphasize the product and services being offered. Taken from the folding doorway, this photograph also shows part of the home planning center in the right background. Architect: David J. Griswold & Associates.

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they form a fitting backdrop to the shop and its basic purpose.

Because of the limited number of products offered by the telephone company, Griswold had display fixtures specially designed to showcase the merchandise to best advantage. Made of aluminum frames and glass, the flexible and mobile fixtures form islands that are 4 feet, 4 inches square and 6½ feet high. Their construction permits variation of display facilities, while an electrified white terrazzo floor facilitates movement of the islands. Each of the four islands (more can be accommodated) has its own fluorescent tubes, which double as illumination for the products below as well as for the entire shop.

Standing before the mural are 12 stainless steel pedestals, each supporting a color telephone under drop lights of multi-colored Italian Murano glass. Although the telephone is the principal display item, such products as automatic answering devices, volume controls and night lights for home and small businesses are prominently exhibited.

Entry to the shop, which is adjacent to the center's only bus terminal, is through a 12-foot opening that takes advantage of the central air conditioning during business hours. The door, fronting on a main corridor, is a walnut and aluminum screen that rolls back the full width of the opening.

Color was played down somewhat to focus attention on the various shades of today's telephone. Accent colors, however, are present in many of the display fixtures. Interior partitions are of louvered walnut plywood and aluminum tubing. Walls are white plaster.

Because the shop is a customer convenience center as well as a sales store, considerable attention was given to comfort as well as aesthetics. Specially selected Herman Miller furniture is used throughout the sales area and in the lounge-like customer planning center.

In addition to the planning area, which is a highlight of the shop's service program, the 1,500 square feet of space accommodates a customer's room, a nook for the manager and desk space for her service representatives, a public telephone, foreign directory library and a utility room.

Although effective design is the shop's magnet and sales aid, service is the keynote. In addition to handling most of the services performed by the company's central office, the shop is helping homeowners plan their telephone wiring before building, aiding with color schemes, set locations and extensions, and advising of many other little known conveniences. These offerings are being promoted on a Southdale television show, by organized tours of the shop during which refreshments are served, and through demonstrations.

What has this smartly-designed, unique shop accomplished since its opening last Christmas? Actually Northwestern Bell has nothing with which to compare its success. Its public relations value is unquestioned, and as a merchandising center it is drawing considerable interest and traffic, and appears to be fulfilling its purpose.

Nine Telephone Loans Approved by REA

NINE LOANS were approved during the week of Sept. 7 by the Rural Electrification Administration as follows:

The Rocksprings & Nueces Canyon Telephone Co., Rocksprings, Tex.; $75,000; Sept. 8.

This loan will help to provide initial telephone service to 82 subscribers. The loan also will enable the borrower to complete previously authorized construction.

The Rocksprings company now has received a total of $649,000 in REA loans. Upon completion of its present system it will be serving 892 subscribers. Its four exchanges, located at Rocksprings, Camp Wood, Barksdale and Utopia, have all been cut-over to automatic operation.

Claude H. Gilmer is president of the Rocksprings & Nueces Canyon company and Carson Gilmer is manager.

•

Bear River Telephone Co., Tremonton, Utah, $459,000; Sept. 8.

These funds will aid the borrower to provide facilities to furnish initial service to 246 subscribers; to acquire 39 miles of line and carrier equipment from the Mountain States Telephone & Telegraph Co.; to purchase and install automatic ticketing equipment in the Tremonton exchange; and to complete its authorized system.

REA loans to the Bear River company now total $1,046,000 which will make possible new and improved service to 2,327 subscribers. The completed system will consist of four automatic exchanges, all of which are in operation serving approximately 2,050 subscribers.

R. B. Waldron is president and Vincent Chiodo is manager of the Bear River company.

•

Penasco Valley Telephone Cooperative, Artesia, N. M.; $139,000; Sept. 9.

These and funds from a prior loan will enable the borrower to improve service for 43 subscribers, and furnish initial service to 112 subscribers.

As a nucleus for the new service, the borrower proposes to acquire from Mountain States Telephone & Telegraph Co. six miles of toll station facilities in the Loco Hills area which serve 37 subscribers. It also plans to acquire by abandonment facilities which serve six other subscribers.

A new automatic central office will be constructed at Loco Hills. This borrower has now received two REA loans, totaling $637,000, which will make possible new and improved service for 672 subscribers. The completed system will consist of five exchanges of which four now furnish dial service to approximately 280 subscribers.

J. B. Runyon is president and Paul Frost is manager of the Penasco Valley cooperative.

•

Farmers Mutual Cooperative Telephone Co. of Shelby County, Harlan, Ia.; $137,000; Sept. 10.

This loan will help to complete the authorized system, construct a new warehouse-garage building in Harlan, and provide for an increase in the proportion of private and semi-private lines.

REA loans to this borrower total $719,000 which will benefit 1,215 subscribers. The four exchanges of the system are now furnishing dial service to approximately 1,100 subscribers.

Wendell Lytle is president and Donald E. Woodard is manager of the Farmers Mutual Cooperative company.

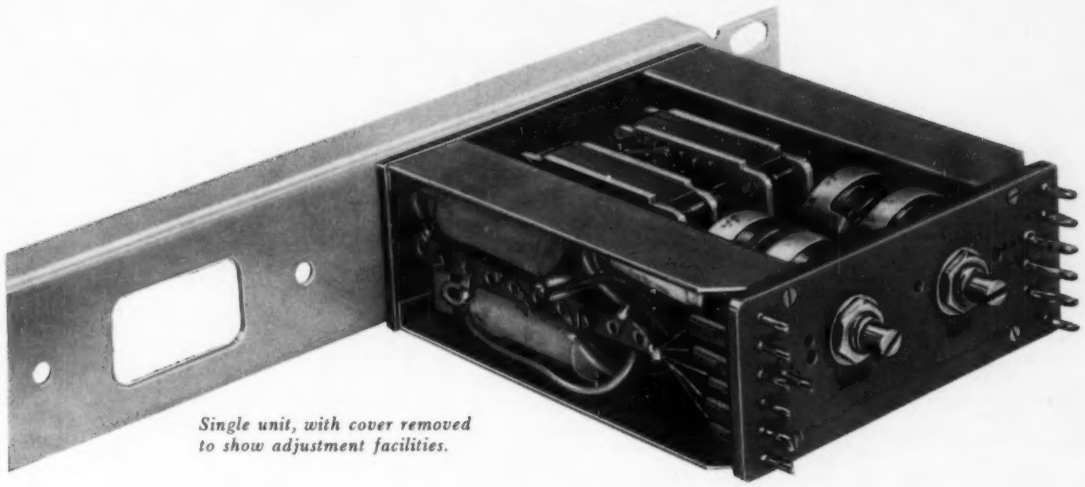
•

East Ascension Telephone Co., Gonzales, La.; $1,444,000; Sept. 10.

These funds will enable the borrower to furnish initial service to 2,966 sub-

(Please turn to page 85)

A compact 4-wire terminating set



Single unit, with cover removed to show adjustment facilities.

Segregation of hybrid terminations and signaling equipment from the four-wire carrier or voice frequency circuits gives great flexibility in the methods of terminating the circuits.

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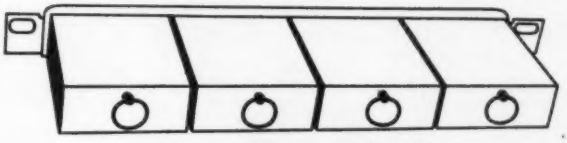

4 units assembled on mounting plate.

Max. projection from face of mounting plate	**5-1/16 in. (130 mm.)**
Height	**1-11/16 in. (43 mm.)**
Width	**4-1/8 in. (105 mm.)**
Weight (single unit)	**2 lb. 1½ oz. (0.95 kg.)**
Weight of 4 units on 19 in. (483 mm.) x 1¾ in. (44 mm.) mounting plate	**9 lb. 10 oz. (4.4 kg.)**

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scribers. The borrower plans to construct new automatic office buildings in newly created exchanges at South Gonzales and Sorrento.

Provision is also made in the loan to expand the present headquarters facilities at Gonzales, to install 16 automatic mobile radio units (10 for subscriber service and 6 for system maintenance), and to increase the proportion of private and semi-private lines.

REA loans to the East Ascension company now total $2,916,000 which will make possible new and improved service for 6,568 subscribers. The completed system will consist of five exchanges. Three of them are in operation, furnishing dial service to approximately 2,970 subscribers.

Mrs. Anona C. Banker is president and Fred N. Banker Jr., is manager of the East Ascension company.

•

Steelville (Mo.) Telephone Exchange; $251,000; Sept. 10.

These funds will enable the borrower to furnish initial service to 640 subscribers. In order to provide this service, the borrower plans to create a new exchange at Viburnum and construct a new automatic office building there.

REA loans to this borrower now total $754,000 which will benefit 1,584 subscribers. Three of the proposed four exchanges—at Cherryville, Huzzah and Steelville—are now furnishing dial service to approximately 900 subscribers.

S. H. Hicks is president and R. T. Randel is manager of the Steelville exchange.

•

Blackfoot Telephone Cooperative, Missoula, Mont.; $200,000; Sept. 10.

These funds will enable the borrower to improve service for 266 subscribers, and furnish initial service to 53 subscribers. The existing subscribers now receive magneto and common battery service from the Charlo Telephone Co. which the borrower proposes to acquire. In addition, the cooperative plans to acquire four miles of Mountain States Telephone & Telegraph Co. line.

New automatic facilities will replace existing equipment in the Charlo central office building. REA loans to the Blackfoot cooperative, now totaling $736,000, will benefit 964 subscribers. Four of five proposed exchanges are now furnishing dial service to approximately 460 subscribers.

Mrs. Margaret Jorgenson is president and Jay W. Preston is manager of the Blackfoot cooperative.

Central Telephone Co., Decatur, Tex.; $360,000; Sept. 10.

This loan will help provide facilities to furnish initial service to 1,032 subscribers. A portion of the funds will also be used to install mobile automatic two-way radio equipment to serve 19 subscribers, and to provide system maintenance.

REA loans to this borrower, now totaling $2,168,000, will enable it to provide new and improved service to 4,640 subscribers. Five of the proposed eight exchanges are now furnishing dial service to approximately 2,722 subscribers.

Earl W. Nunneley is president and manager of the Central company.

•

Etex Telephone Cooperative, Gilmer, Tex.; $239,000; Sept. 10.

This loan will help provide initial service to 506 subscribers.

An automatic central office building will be constructed in the newly-created Mims exchange area to serve 82 of the new subscribers. The remaining 424 are located elsewhere in the borrower's area.

REA loans to the Etex cooperative, now totaling $1,030,000, will enable it to furnish new and improved service to 2,180 subscribers. Five of the borrower's proposed six exchanges are in operation, serving approximately 1,118 subscribers.

Welby Carlock is president and Chester M. Moore is manager of the Etex cooperative.

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TREE TRIMMING TOOLS

No. 1-WSQ (Square End Mount) Pulley Type Tree Trimmer

Because of demand for a tree trimmer head designed for mounting on a square end pole, we have produced a one-piece hook having a box-like shank so as to accommodate our 1¼"x1⅛" rectangular poles. This type supports the pole on three sides, permitting quick, easy assembly to a square end pole.

The operating parts are the same as used on our No. 1-W Pulley Type Tree Trimmer, and are interchangeable.

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New Employes Need to Stay And Give a Job a Chance

How To Orient Newcomers

By William J. Milford

A TELEPHONE company office may be a pleasant place to work, have many opportunities for advancement both in responsibility and in salary and still have a high rate of employe turnover.

The cause of this problem may lie in the new employe's introduction to his job and his surroundings since experience has shown that the great majority of those leaving new jobs do so in the first week.

From case histories and interviews as well as the advice of employe-relations experts, this writer has found 10 steps the average telephone company executive can follow during a new employe's first week to assure himself that the efficient individual is not lost to the company and that employment problems of the future are minimized.

(1) *Indoctrination* — "We start at the very beginning by telling the newcomer all about the company, its history, what it does, and why," one executive said.

Not only does this procedure answer the employe's natural questions, but it gives the individual a better background to understand his work. It also builds a sense of interest in and loyalty towards the company.

Some firms do this verbally. In most cases, an executive has this job.

In others, an employe, especially suited to the assignment, regularly handles this informational indoctrination.

Several companies do it by distributing a well-prepared printed or mimeographed folder supplying such information.

Practically every organization which has found this step worthwhile takes it on the very first day of employment. They devote this time chiefly to supplying this background rather than plunging the employe immediately into the work itself.

(2) *Ground Rules*—"It is impossible to run any firm without a good set of rules and regulations," another executive said while being interviewed. "Whether there be two or 200 people on the staff, good rules and regulations make up the framework of smooth operation. Lack of them, or misunderstanding about them, can provide an endless cause of friction."

Most companies prepare a list of these rules and regulations and give this to the employe immediately after he is hired. He is told to take them home and study them before reporting for work.

Successful lists are carefully written and prepared to avoid any "Thou Shalt Not" approach. One firm heads this list, "Work is easier in the _____ company because we go by these rules of procedure." Such a positive, rather than "Do Not" negative approach not only receives a better initial reception from the new employe but secures a greater degree of cooperation later on.

Acceptance and compliance come more quickly and surely when the *why* of these rules and regulations is presented at the same time.

At the start of employment, the individual often looks for the "why" of company rules; frequently his interpretation won't be the proper one.

(3) *Introductions* — The new employe should be personally conducted through the organization or department where he or she will work and introduced to his co-workers. This should be done the same way we would introduce a friend at a party. Developing the skill to make this an informal and easy step pays in getting the new employe started with a feeling of being welcome in the organization from the very first moment.

(4) *Facilities* — It is important to have either his immediate supervisor or closest co-worker show the newcomer facilities of a personal nature such as rest rooms, lockers, etc. This is an obvious step; yet it is often overlooked.

Leaving the new employe to discover these things for himself on the first day can contribute to feelings of uncertainty.

Experience has shown it best to have this done by a fellow employe rather than by an executive or department head. It is an easy opening wedge to help the new employe establish a friendly personal contact on his first day.

(5) *The Job Itself*—The proper introduction of the new employe to his work is accomplished best where management carefully selects the staff member most capable of doing so to explain the job.

In several offices, varying this assignment around the staff, with first one individual doing it and then another, has proved helpful.

"I know there are few people exactly like one another," one executive remarked in explaining this plan, "and for that reason I try to select a current employe who seems to be of the same temperament and disposition as the new individual to handle the initial work introduction.

"Of course, at the time of hiring, I explain the job itself and the general work scheme but I've found it best to leave details for presentation by someone with whom the new employe will work closely."

(6) *Significance*—Better results follow when a deliberate effort is made to make the newcomer understand the importance of his job and *why* it is important.

This stimulates personal interest at the beginning and builds a first-day attachment to the work. This attachment helps to overcome any other difficulties in getting started that can arise in the first week or two.

"Don't forget that *why*," the people we interviewed told us time and time again. "Good employes are not blind robots. They want to know why they are doing something and why it is an important thing to be doing."

(7) *The Future*—A picture of rewards ahead should be presented at the very start of employment.

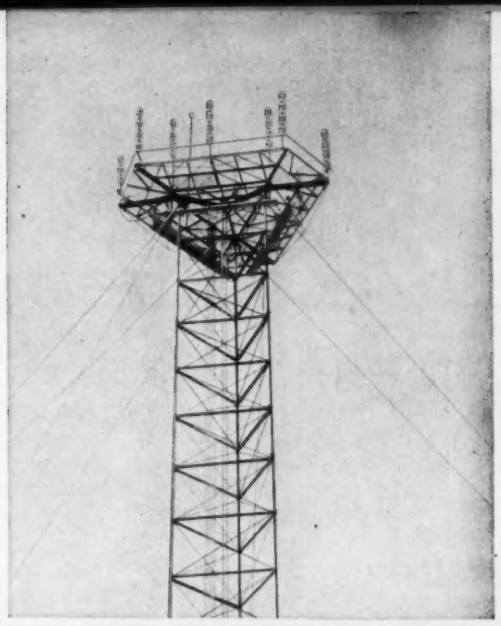
"I left there because I just couldn't see any future with that firm," we have been told by a number of workers who left jobs during the first week or two. Too often we feel this is something the employe will acquire later on, as he becomes better acquainted with the company.

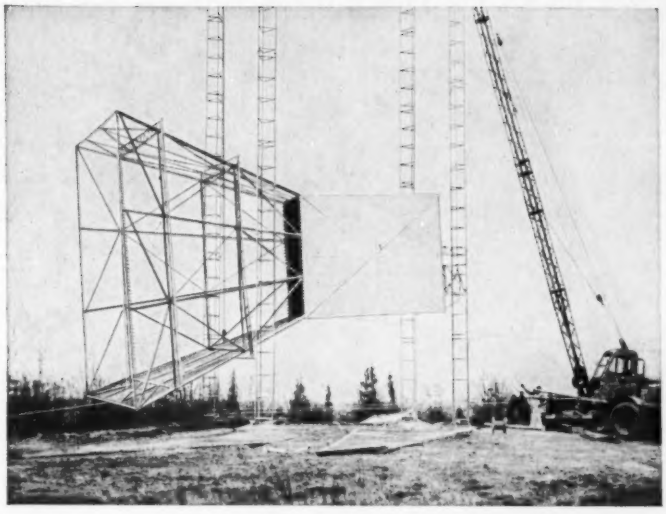
Leaving this point to chance can result in the loss of those who might have been excellent staff members before they have a chance to acquire such information.

(8) *Helping Hand*—The new worker

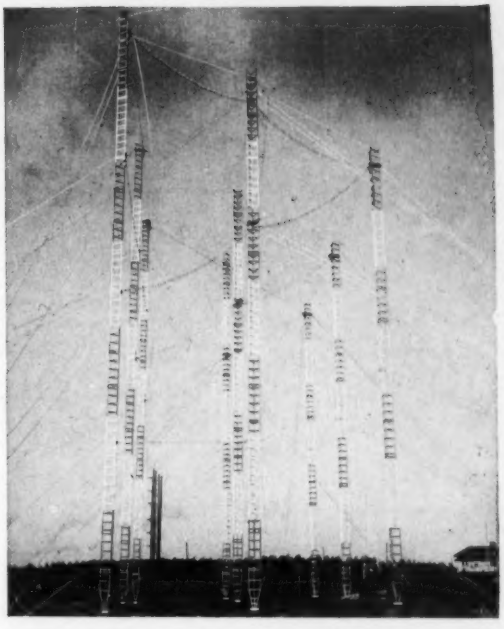
(Please turn to page 120)

Special-design tower supporting Air Force antennas for test purposes.





Horn-type receiving antenna and support towers for signal amplification.



Towers supporting large curtain type antenna for scatter communication.

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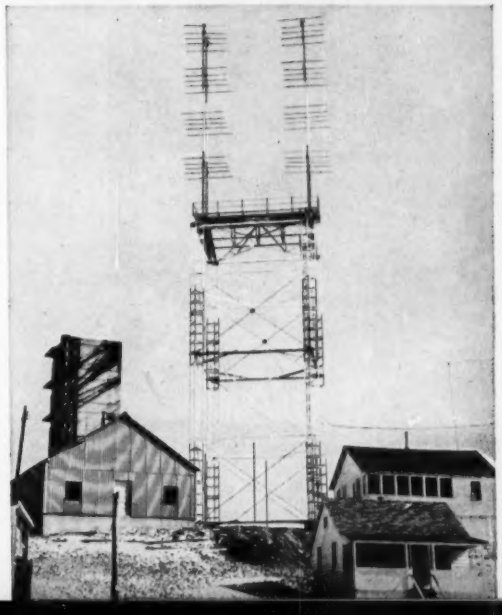

Special design self-supporting test structure having very rigid deflection and ice load specification.

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a new telephone alarm system by Automatic Electric

Dramatically direct emergency reporting! Any number of strategically located street boxes provide direct telephone communications. Direct from the public to Fire headquarters. Or, from the patrolman on the beat to Fire or Police headquarters.

Now the general public has instant voice contact with Fire Department headquarters—simply by picking up a telephone handset located in the weatherproof street box.

Each call is instantly recorded on an automatic typewriter which types out the street box number, the time and the date a call is made. The conversation may also be voice-recorded on tape and stored for future reference.

Open lines or acts of vandalism to the instrument or the telephone cord are reported automatically to headquarters.

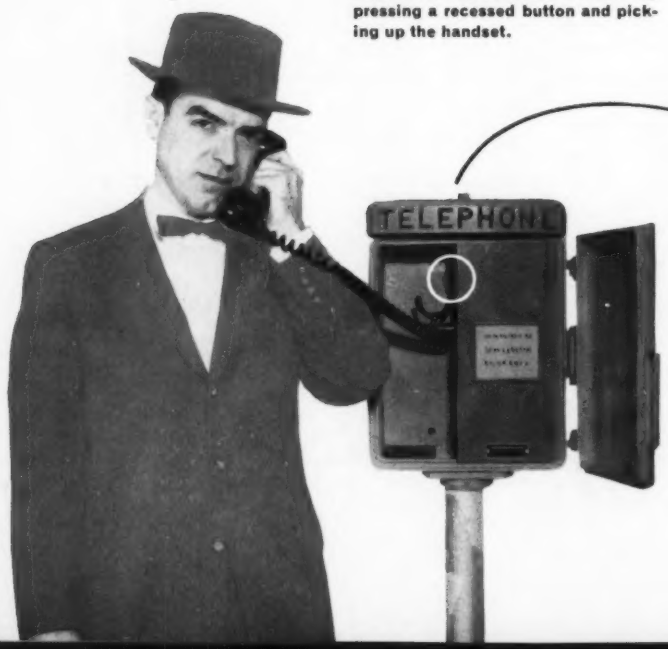
The Fire and Police Department switchboards which receive calls from the street boxes are arranged so as to provide interconnection with other telephone facilities.

TO REPORT A FIRE

The passerby opens the street box, picks up the handset and talks directly to the Fire Department operator.

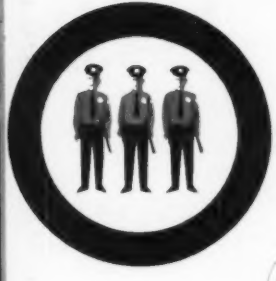
TO CALL THE POLICE

Authorized police and city personnel get direct connection to the Police Department switchboard console by pressing a recessed button and picking up the handset.



police reporting

The trained operator at the Fire headquarters switchboard can request details before notifying the appropriate station. A call locks into the switchboard—a light and audible signal continue even after the street box telephone is hung up.



The operator at the Police Department switchboard can transfer the call to a specific section of the department, or he can obtain all the information necessary and then relay it to the appropriate division.

FOR MORE INFORMATION WRITE THE VICE PRESIDENT, COMMUNICATIONS PRODUCTS SALES, AUTOMATIC ELECTRIC SALES CORPORATION, NORTHLAKE, ILLINOIS.

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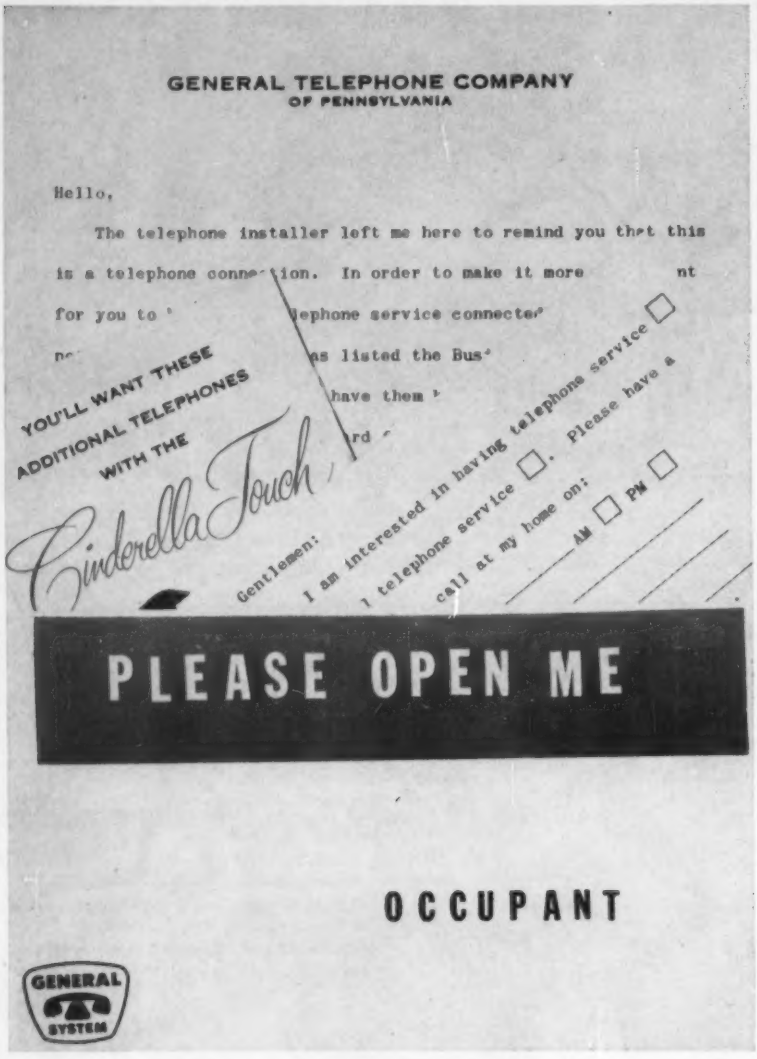
Kellogg's complete research and development resources are supported in depth by ITT's unmatched world-wide facilities. Together they form a scientific team unequalled in modern communications.

FABRICATION
Modern plants and facilities, equipped with the latest machinery, turn out precision-made components for Kellogg equipment. Parts and finished assemblies are carefully inspected and tested assuring long, reliable service.

FINANCING
It's easy to own Kellogg equipment. Your local representative will be glad to explain our low-cost financing arrangements.

INSTALLATION
No matter how fine the equipment, it's of no use until installed and operating. Kellogg experts will see that your installation is promptly set up and maintained to work efficiently.

EXPERIENCE
More than 60 years of it serving independent telephony, always with the finest telephonic equipment and the soundest counsel, brought about by an intimate acquaintance with your needs.



General of Pennsylvania's new occupant packet contains a letter of instruction, a self-addressed, stamped return post card and a promotion brochure.

Raymond J. Fitzgerald (right) explains the details of his suggestion to Frederick C. Rahdert, operating vice president. Mr. Rahdert awarded Fitzgerald a $100 savings bond for his idea.

Hello, I'm Here To Help You

By Richard Hockensmith*

WHENEVER THERE is a change of occupancy in an apartment or a house, the new tenant needs telephone service. How does he arrange for it?

General Telephone Co. of Pennsylvania believes in leaving nothing to chance. It has initiated a program designed to guide a prospective subscriber straight to his area business office.

Following a suggestion submitted by Raymond Fitzgerald, Erie installer-repairman, General now attaches an eye-catching information packet to the connecting block when telephone service is removed from a residence.

This packet tells the new occupant what to do to get telephone service.

A red-trimmed envelope addressed to "occupant" and headlined "Please open me," contains a letter of instruction to the potential subscriber; a self-addressed, return post card, and an appropriate and timely brochure on telephone service or equipment.

The letter of instruction, written on the company's letterhead reads as follows:

"Hello,

"The telephone installer left me here to remind you that this is a telephone connection. In order to make it more convenient for you to have your telephone service connected, if you have not already done so, he has listed the business office telephone number so you may call and have them help you with your order.

"He has also attached a post card for you in case you do not find it convenient to contact the business office during our working day.

"We would like an opportunity to serve you, so please let us hear from you.

"Business office telephone number—"

The installer attaching the packet to the connecting block fills in the appropriate business office telephone num-

*Mr. Hockensmith is the editor of the General Telephone Co. of Pennsylvania's *General News*.

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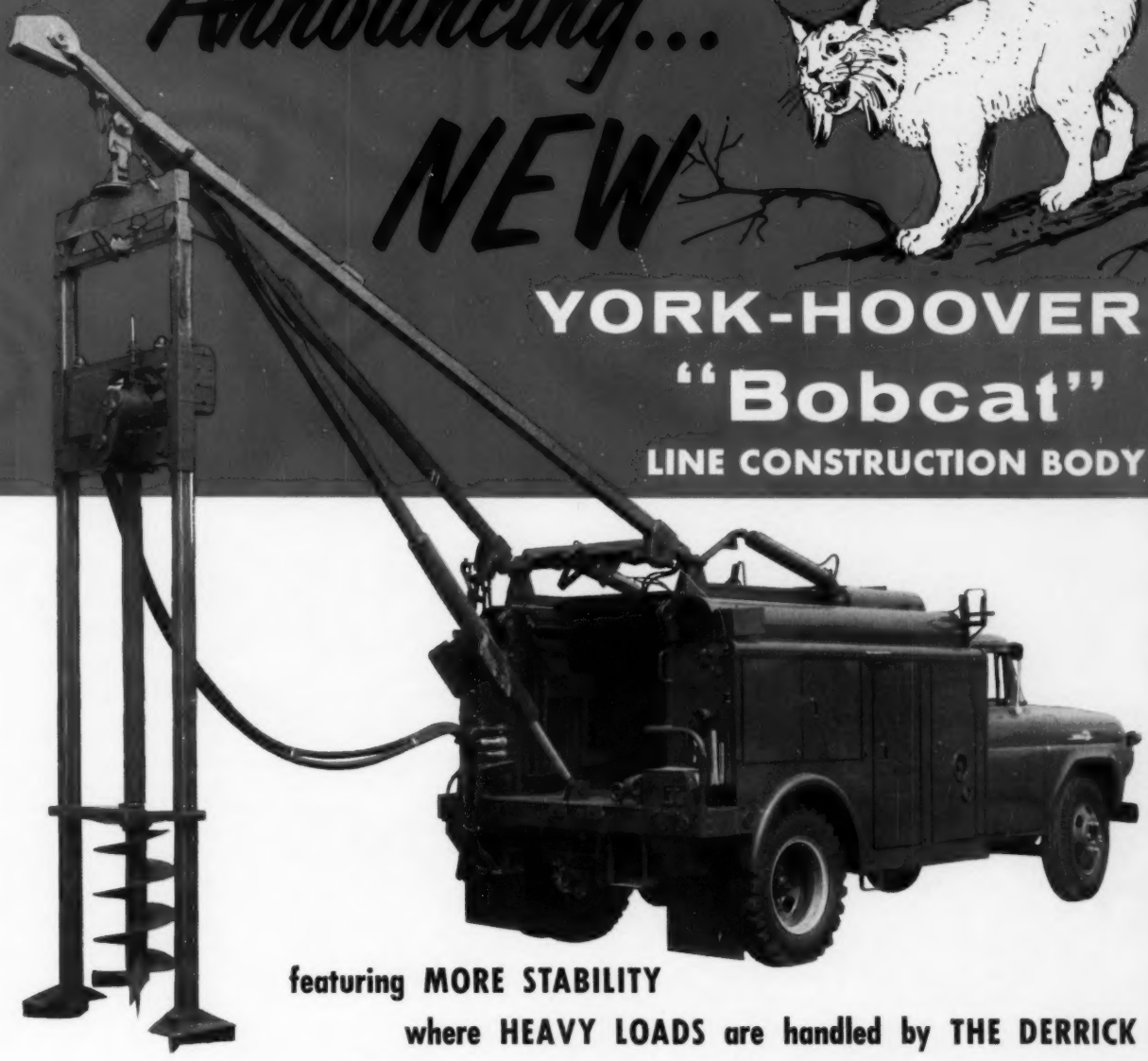
YORK-HOOVER "Bobcat" LINE CONSTRUCTION BODY



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where HEAVY LOADS are handled by THE DERRICK

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superior corrosion resistance

HEAVY DUTY BASE
provides maximum strength and rigidity

SIDE BOXES
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DOORS
rigid, sag-free, low maintenance

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low, compact, easy loading

DERRICK AND DIGGER EQUIPMENT
wide variety, tailored to your needs

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York, Pa.

Gentlemen,

Please send us a copy of Bulletin No. 947 covering your new "Bobcat" Line Construction Body.

Name_____

Company_____

Address_____

City and State_____

Creative Engineering for the Public Utility Industry Since 1892

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ber depending on the area in which he is working.

Text on the post card is a brief fill-in type form which provides for arranging an appointment, at a time convenient to the potential subscriber.

The post card reads:

Gentlemen:

I am interested in having telephone service ☐ additional telephone service. ☐ Please have a representative call at my home on:

Date ..... AM ☐ PM ☐

Name .....

Address .....

Telephone No. .....

The plant employe removing the service attaches the packet to the connecting block as shown.

The reverse side of the card is stamped and pre-addressed for the applicable business office.

A number of brochures may be used advertising special equipment or services, color telephones, etc.

Currently, the brochure in use depicts telephones with a "Cinderella Touch." It is designed to catch feminine interest by showing colored telephones in various settings in the home.

The red-bordered envelope is as conspicuous as possible. When attached to a connecting block in an empty room, it stands out so well there is little likelihood of its being overlooked.

This promotion gives the company another opportunity to serve its subscribers.

Will to Live

The chairman of the American Medical Association's committee on aging told a Senate subcommittee that physicians have yet to find an antibiotic for loneliness and rejection—and that these two factors, plus a lack of useful things to do, emphatically affect the over-all health of the aged. He added that society has a responsibility toward the aging to stimulate in them a will to live and to encourage them in their desire to be self-reliant and useful.

Only People Pay Taxes

By PAUL HARVEY

AMERICANS, two weeks ago I, Paul Harvey, started out chasing a sneak thief . . . and I ended up with the detection of Public Enemy Number One."

I have been two weeks on the trail.

I am very tired. But the job is done.

No conviction yet. But I can name him now. And he is yours to prosecute as you see fit. Before I tell you his name . . . Here's what happened.

Two weeks ago I got a letter from a farmer on the subject of the last election.

But he included this question, "Who is the middle man who is getting rich off the farmer?"

He said he sells a bushel of wheat for $1.73.

By the time that bushel of wheat is made into 66 loaves of bread it costs housewives $15.84. Whoa, there!

"Who's getting rich on me?" the farmer wanted to know.

Well, I've heard that question repeated so often that I had stopped listening to it.

But suddenly I decided on the one way to silence that noisome question — nobody had tried —

And that was to answer it.

Well, with my limited staff we started playing detective.

For the wheat in a loaf of bread the farmer gets 2½ cents.

But you pay 24 cents.

So you are both being robbed by somebody. Who?

I figured I'd backtrack on the culprit. So I went to the grocery store. "How much do you take out, Mr. Grocer, when you sell a loaf of bread?" I said. "There's more than 20 cents missing that somebody's getting. Is it you?"

Well the grocer showed me that his markup is confined by competition to only 3 cents.

In view of his salaries and overhead, that markup seemed fair enough, especially when he explained that he has to pay more than half of it back in corporate income taxes not covered in the sales tax.

And also he contributes to the social security and unemployment taxes of his employes.

He pays an electric bill every month plus a tax on it. And his delivery truck was taxed when he bought it and the gasoline it uses and the license plates it wears are all taxed.

So, all this overhead, not to mention his own income taxes, made 3 cents seem a fair enough "profit" for the grocer to make on that loaf of bread.

Anyway, he was not the robber I was looking for.

I went to the wholesaler and rode on one of the trucks that delivers the bread.

Paul Harvey, distinguished ABC news commentator broadcast "Only People Pay Taxes" on Nov. 30, 1958. Mr. Harvey, who has two network shows originating from Chicago, also writes a daily newspaper column. He has given TELEPHONY permission to reproduce his thought-provoking commentary.

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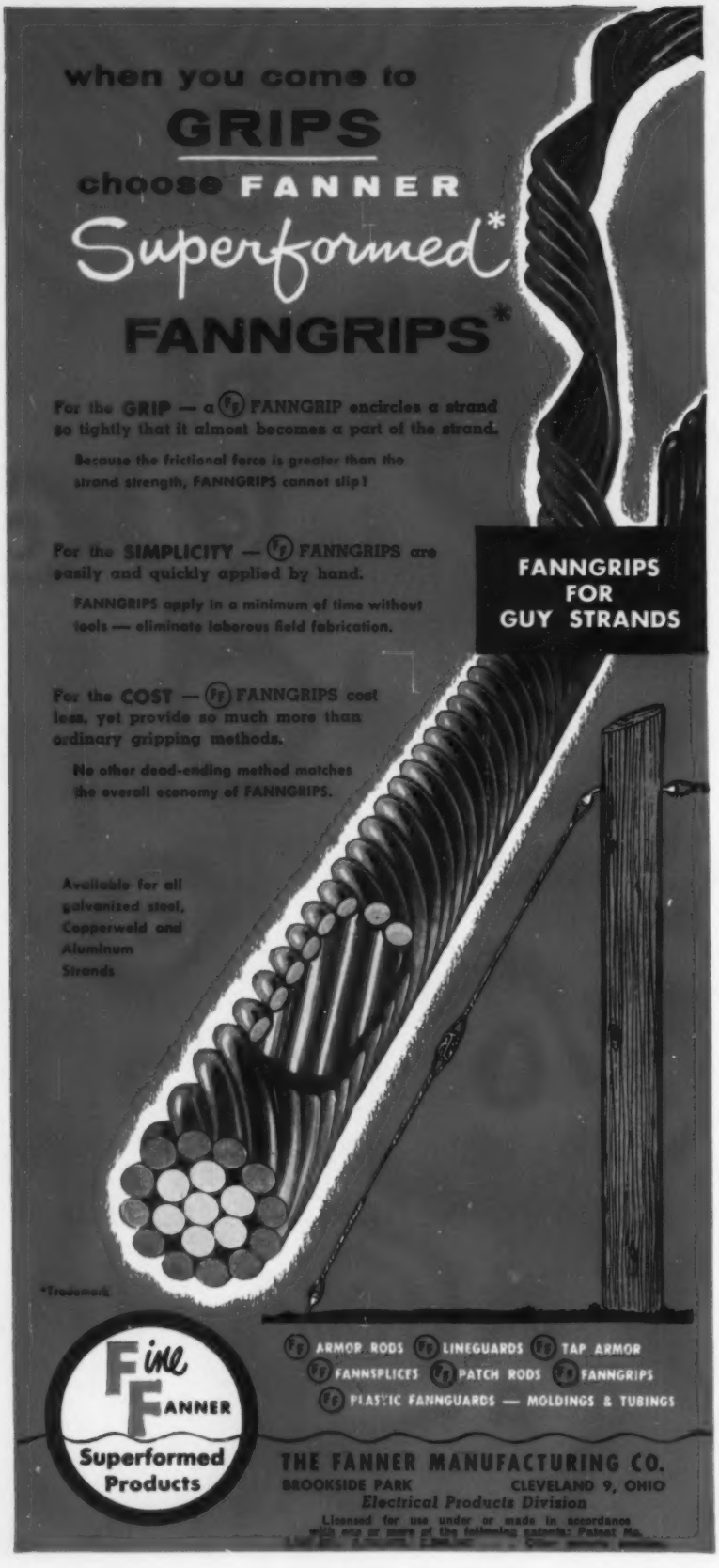
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Maybe this driver was the boy who's been picking the farmer's pocket.

After all, the Teamsters' Union, you know.

But I divided the number of loaves of bread the man delivers by his wages per week and his take is less than 1/20 of one cent a loaf. So he's doing all right. But he's not stealing anything.

There's too much spread between the price and the cost of a loaf of bread. The guy I was looking for doesn't have just a finger in the kitty.

He's in there with both fists.

I kept looking.

There were two tedious days of sleuthing for this sneak thief before I backtracked on that loaf of bread as far as the flour mill. But I made sure that I didn't miss any possible middlemen in the bakery or in the railroad that hauled the flour . . . or anywhere.

And not one was getting away with anything. I mean the profit slice which each took for his services was an infinitesimal fraction of one-tenth of one penny per loaf. Not even measurable.

Then I got a tip. Check the sugar source. If nobody in the wheat-flour ingredient was robbing us — Maybe the sugar people. I backtracked to a New Orleans refinery and it was another dead-end. The price you pay for the sugar and the salt and the yeast and the milk solids and the shortening in the loaf of bread . . . all put together . . . comes to less than one-fourth of one cent per loaf.

So . . .

And here is where I stubbed my toe. By the time I added everybody's profit for handling the materials and the finished product plus the cost of the ingredients . . . I figured it all up . . . and it came to 12 cents for a loaf of bread. You should be paying 12 cents for a loaf of bread.

But I can't get my grocer to sell me a loaf for less than 24 cents.

Who's doubling the price of my loaf of bread?

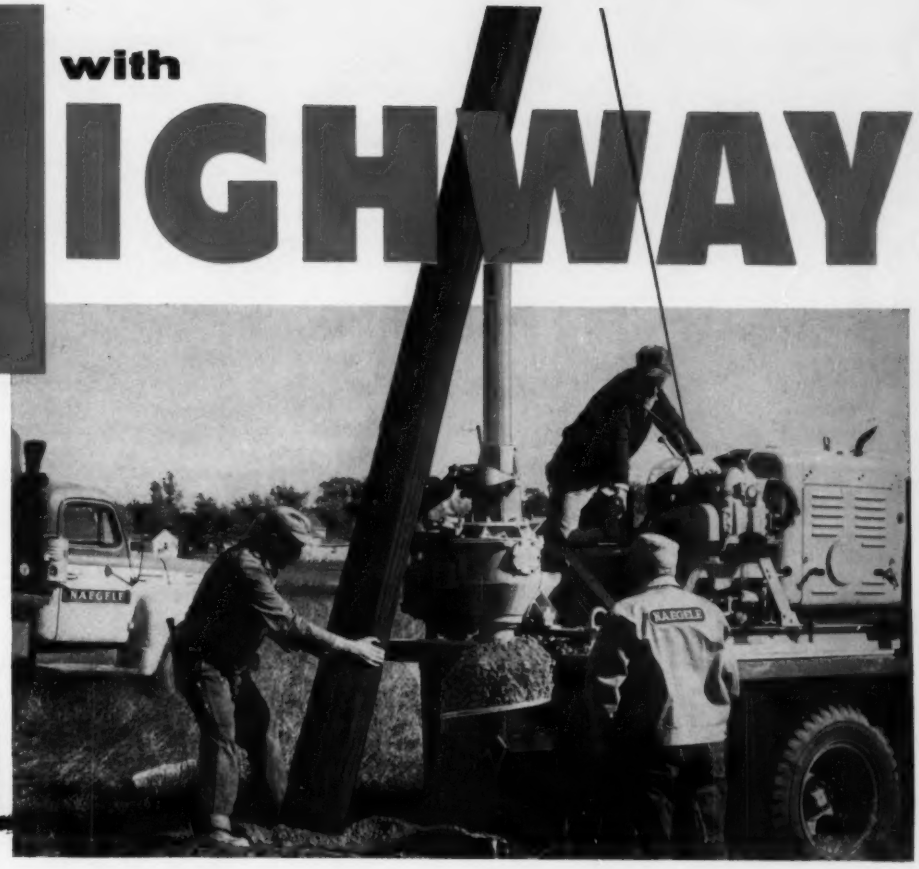
Who's getting away with that other 12 cents?

I had figured every handler's wage down to the most minute fraction. My figures could not be wrong.

But a loaf of bread added up to 12 cents and it's still selling for 24 cents. I was getting as angry as the farmer who'd written me that letter. It's frustrating to have your wife go to the grocery store and—somewhere in there—get robbed by a ghost!

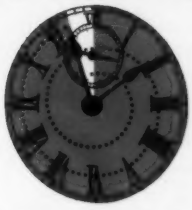
Well . . . I went back to the farmer. I decided to start all over again, but working forward from the farmer. The

with HIGHWAY

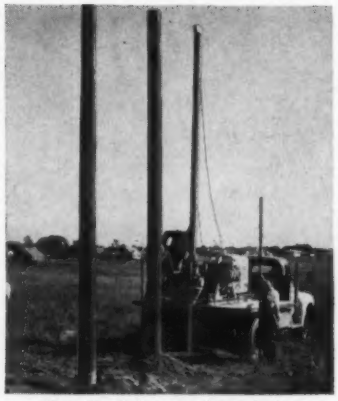


NAEGELE

cuts a 1½-day job to



1 hr. 57 min. with a 4-man crew



Digs the hole, sets the pole in any type of soil, including frost and hard pan.

"We can put up more boards, have happier crews, and take less time now that we have our Highway digger," says Bill Hayes, Superintendent of Naegele Outdoor Advertising Company, Milwaukee, Wisconsin. Since Naegele bought an HDAMS Earth-Boring Machine, they've saved over $50 on labor per board. Bill expects even greater savings this winter as his unit can dig frost and hard soil easily and swiftly.

The Naegele-owned HDAMS Earth-Boring Machine can dig holes 9 to 20 inches in diameter, and up to 10 feet deep. In just two minutes the 20-inch auger can dig a seven-foot hole! This skid-mounted digger is a *complete* unit with integral winch and derrick, offering you economy of operation, convenient controls, and positive gear drive. Why not send for complete information and specifications today?

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UTILITY DIVISION

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SALES AND SERVICE IN PRINCIPAL CITIES

research went faster this time because I knew the direction.

And this time I caught him. Red-handed. The guy who's picked your pocket every time you buy a loaf of bread. And he's been dealing himself in when you buy milk, too. There are 206 separate transactions involved in getting a quart of milk from the pasture to your doorstep. And sure enough, I found the same guy doubling the price.

The syndicate he operates is so smooth and so subtle that it's little wonder he's escaped the rap for this before.

But I'm going to name him tonight.

Because he's gradually aiming to double the price of your loaf of bread again.

And again.

While the farmer fusses and fumes and shadow boxes with imaginary villains, the real one has been in hiding.

I took that farmer's bushel of wheat to market. The farmer got $1.73 for it. 2½ cents per loaf of bread.

But when the flour mill added its fraction for milling . . . wait a minute . . . The flour to make one loaf of bread has suddenly doubled! It comes out of the mill costing 5 cents. Not 2½. Still the mill is getting only a minute fraction of a penny for itself.

But the mill is required to pay . . . Now the trail gets warm . . .

The mill has to add on seven federal taxes and eight separate state taxes.

The railroad which hauls the finished flour . . . now the trail gets hot . . . keeps only a tiny fraction of a penny for its services . . . but adds on two pennies to pay five federal taxes, plus state taxes in every state through which the shipment passed.

In this case there were three.

Jumping jehosephat! I thought taxes just soaked the rich! This is soaking anybody who buys a loaf of bread.

And when I backtracked on those other ingredients, I found the sugar refiner paid eight federal taxes and six Louisiana state taxes. The railroad that hauled the sugar paid taxes. The warehouse where the salt was stored in Chicago paid taxes. The shortening manufacturer and the yeast factory and the producer of the milk solids . . .

Each was keeping for himself such a minute profit that the total cost of the ingredients had added only two pennies. But the taxes had pyramided to more than twice that!

I am an amateur detective. But I did the best I could. And when I finally retraced the loaf of bread back to the grocer's shelf . . . I understood why that price tag is more than 10 times what the wheat farmer gets.

Because here are 151 separate taxes on that loaf of bread!

You and I have been complaining, however feebly, about the whack the income tax takes out of our weekly paycheck . . . While we were watching our wallet pocket . . . The hidden tax has been emptying our coin purse! And again and again and again. After all, we've consoled ourselves, the tax man gets only 20 per cent of my income. It's worth that to live in America.

But that's a lie and a delusion. The "tax man" has been picking your pocket for 12 cents every time you buy one loaf of bread. But with such clever slight of hand . . . By such an involved and complicated multiplicity of hidden taxes . . . that his hand was quicker than our eye.

You think you pay $100 tax when you buy a new $2,000 car. Listen: There have been $288 in hidden taxes collected on that car before it ever leaves the factory.

And then there are all the taxes the dealer pays, taxes on income, property, taxes when you transfer the title, when you pay the state tax. So, when you pay $2,000 for a car . . . more than one-fourth of that price is just taxes.

You've been figuring the corporation tax would cost only the big corporations. But look what happened. They added it to the price of the car. We pay it!

The grocer, the trucker, the baker, the miller, they don't pay their taxes. We do! When we buy that loaf of bread. Railroads don't pay taxes. Corporations don't pay taxes. Just people pay taxes.

All the rest of those fellows add their taxes onto the stuff they sell us.

Only people pay taxes.

We can hear that our federal government is sending a billion dollars to Tito . . .

And we figure "so what . . ."

But every time our government spends a billion . . . it taxes the average American family another $25.

Only people pay. How much different it might have been . . . if our government had said it that other way. That "every American family is asked to chip in $25 this year for Tito." Wow!

Conversely, every billion dollars which our government saves . . . Every billion dollars "less" that it spends . . . Decreases the tax load for the American family of four . . . by $25! Wow!

I'm going to remember that. Every time the Washington or the state spenders speak of spending another billion for something or other, I'm going to remember it's 25 of my dollars they're spending. It'll make a difference.

Yes, I finally tracked down the pickpocket. The middle man every farmer has wondered about. The guy who's behind the high prices every housewife complains about.

I found him. And his name is Sam.

But Uncle Sam is not alone. His accomplices are the tax laws of almost all states which add one-third to the price of one quart of milk. The farmer's truck and tractor are taxed. The deliveryman's truck and the tires on it and the battery in it. Even the air in the tires of that truck has four hidden taxes on it! I mean it.

The power to run the compressor motor is taxed. The oil for the compressor. The gas station attendant. The sales taxes on the compressor motor and the rubber hose. Four taxes on the air in the tires of the truck that hauls your milk.

When you get that explicit, counting the indirect as well as the direct taxes, there are more than one thousand taxes on one quart of milk. Taxes have crept up on us—like too many beers.

Historically, whenever any nation has taxed its people more than 25 per cent of their income, that nation has been eating its seed corn—headed for economic decay.

Already our taxes are devouring more than a third of every income dollar. They sought to slip the money painlessly from our paychecks . . . by withholding it before we got it. But like an iceberg, the far greater hunk of our tax load is under the surface—out of sight.

The next Congress has been labeled a spending Congress.

But if they spend more money . . . it will be your money. When they spend a billion for anything . . . it will cost you twenty-five. Both parties . . . will try to buy your vote . . . with your money. For the small wage earner, hidden taxes are far more costly than income taxes. The best kept secret in the United States today is the whole size of the tax load.

There are 150 taxes on one ladies' hat. Gasoline would sell for two cents a gallon . . . except for the tax. And the White House is talking about raising that. (EDITOR'S NOTE: A raise in the gasoline tax has been voted.) When are you going to draw the line?

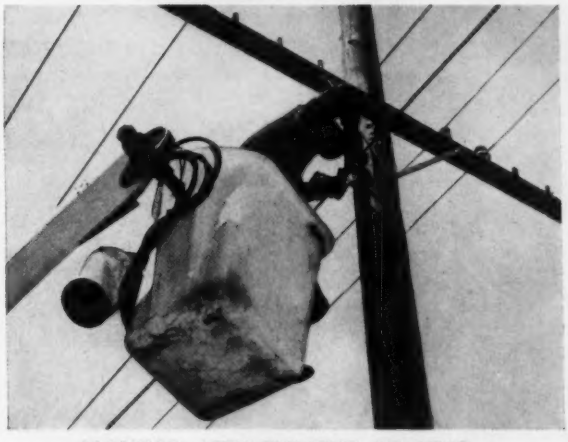
I started out on the trail of a sneak thief and ended up with "Public Enemy Number One."

Now he's yours to prosecute as you see fit.

PLACING CABLE

DISMANTLEMENT WORK

PLACING "B" RURAL WIRE



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Save an average of 50% of the time required for these jobs

Skyworker MODEL 1025 — equipped for all telephone line work — is now in use by many leading telephone companies. Under the most rigorous operating conditions, Skyworkers are sharply reducing man hours per labor unit for these assignments:

CONSTRUCTION: placing strand, cable, multiple wire, cable blocks, guys, strand-mounted loading coil case.

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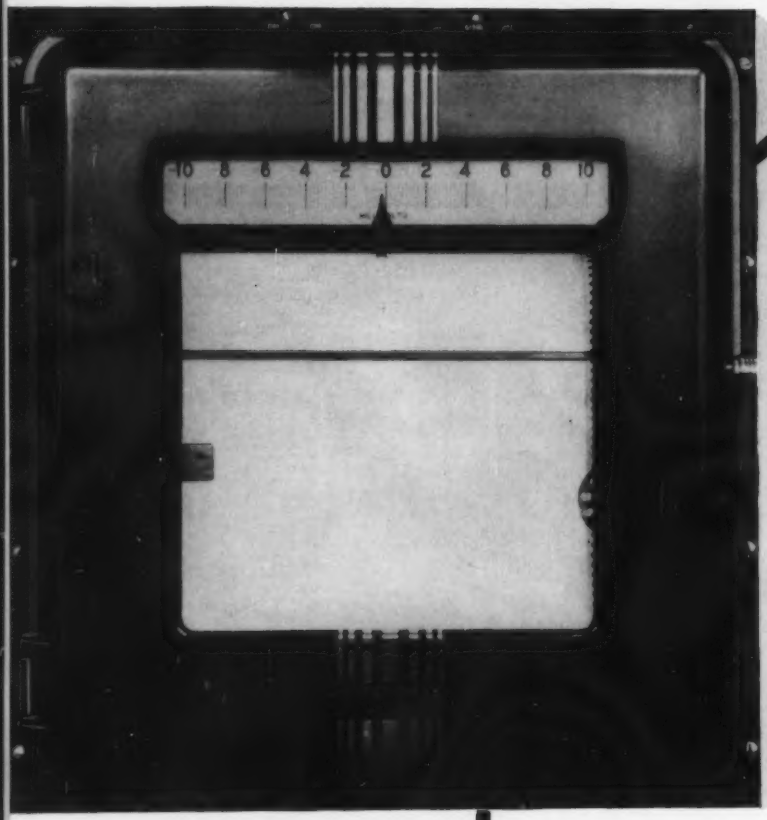

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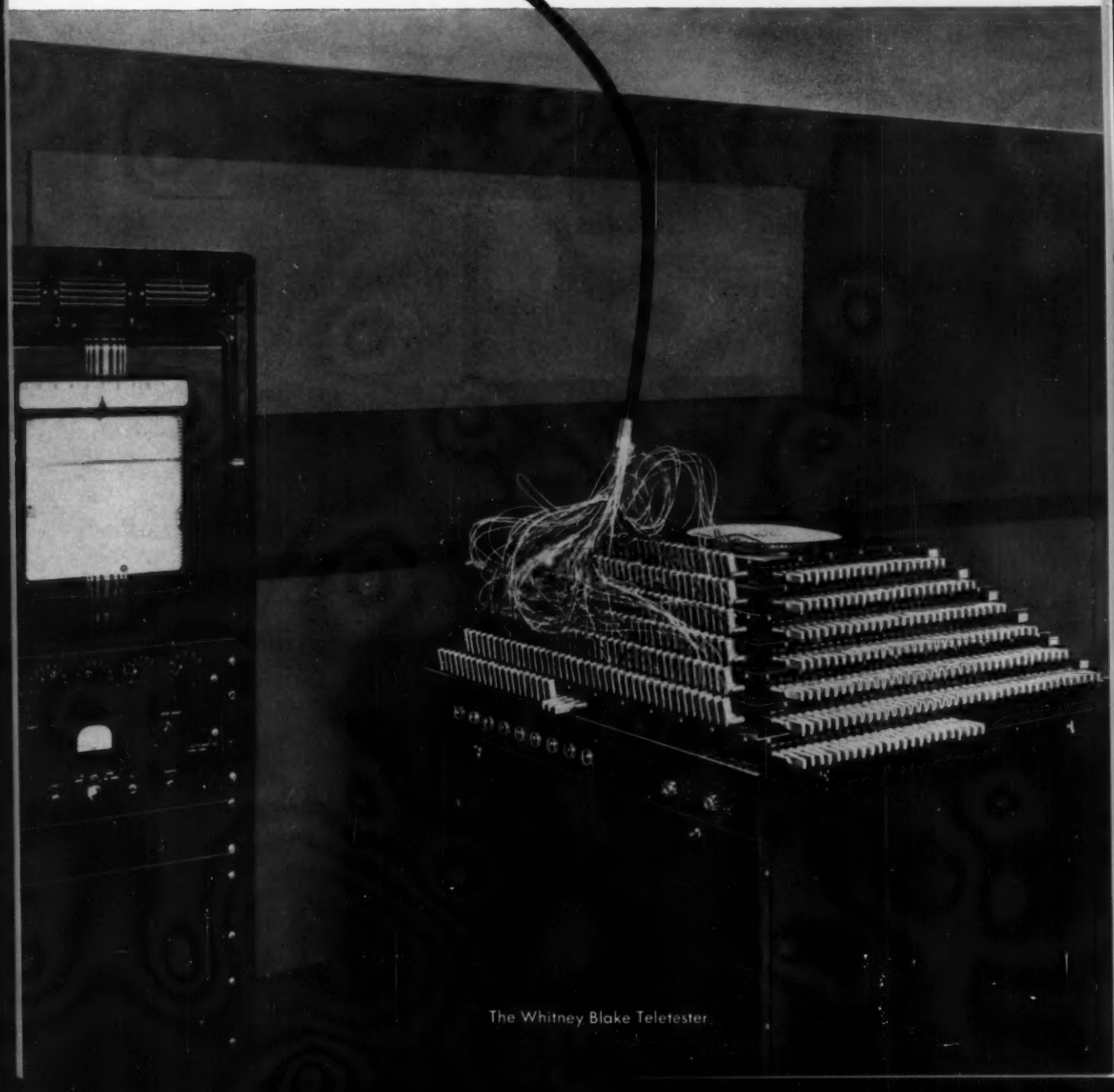
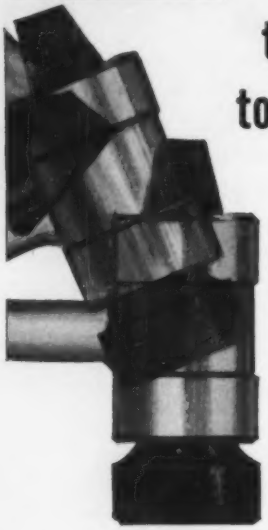


The Whitney Blake Teletester.

COUNT ON SHURE-SET



the "power-concentration" tool that revolutionizes light fastening!

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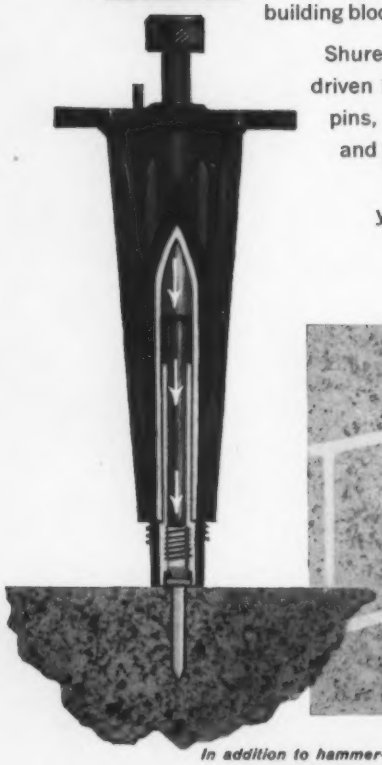

In addition to hammer-in Shure-Set, the versatile Ramset Fastening System includes Ramset powder-actuated method for heavier fastening, and Ringblaster® heavy-duty kiln gun.

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Concluded from page 38

national affairs. With the financial and moral support of more companies, we will be in a stronger position to help all Independent telephone companies, large, medium-sized, and small, meet the challenges of the electronic age and to march forward in the parade of communication progress.

A letter or a postcard to the association, 438 Pennsylvania Bldg., Washington 4, D. C., will bring you informative literature and an application blank by return mail. Or just call us collect—NAtional 8-6512.

MEASURING INSERTION LOSS

Continued from page 72

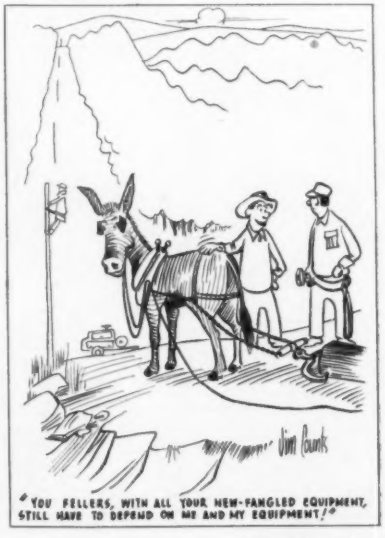
a two terminal impedance shunting the top and bottom terminals. An example of the usefulness of the latter, a bridged connection, is that this method is used to find the insertion loss of a drainage-type protector.

If the reader would like to gain confidence through an example, he might first try measuring the effect of bridging a 600-ohm resistor across a 600-ohm circuit. The procedure and all voltmeter and dbm values are shown in *Fig. 4* as Examples 3 and 4. In the next issue we will have a number of practical examples, two of which will illustrate the measurements of the insertion loss of a filter and of a central office connector circuit.

(To be continued)

A Pact

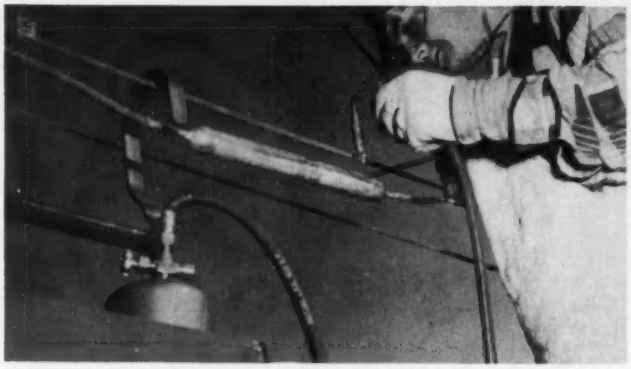
"Friends, if we be honest with ourselves, we shall be honest with each other."—GEORGE MACDONALD.



Mutual LP-Gas Furnaces and Torches

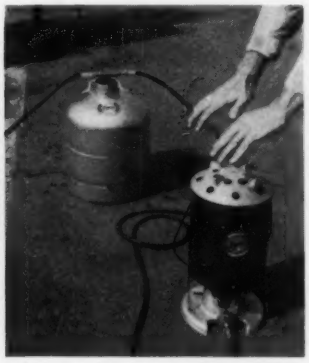
Provide Speed. Ease of Operation for Telephone Linemen and Cable Splicers

A complete line of LP-Gas equipment has been designed by Mutual for the Telephone Trade. Each piece has been field tested and proven through years of use by telephone men. All of the major heating requirements of cable splicers and linemen can be done faster, easier and safer with Mutual LP-Gas equipment. Many telephone companies have made Mutual LP-Gas furnaces, torches and heaters a standard part of their operating equipment.



Mutual's Cable Splicers Kit simplifies the wiping of sleeves on lines high in the air. The small, light-weight B-91 cylinder rests in tool box. Choice of tips: sharp pointed flame (shown); or broad flame. As no lead is melted on ground, only one man is needed.

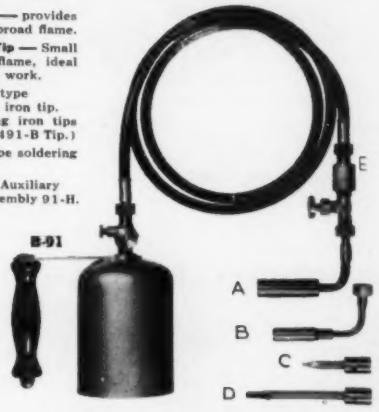
Left — Mutual's cylinder mounted furnace provides fast, economical melting of lead. A nine inch pot of lead is ready for use in six minutes. Pressure is constant, no pumping or priming. Lights instantly. Shield protects from strong wind. Also used with heater as heat reflector.



Right — An LP-Gas heater provides safe, efficient heat for telephone crews. Shown is base-mounted heater attached by hose to Mutual's No. 11 cylinder. The T on cylinder allows one fuel source to be used for heater, melting furnace or hand torch. Heaters are used in aerial tents with safety.

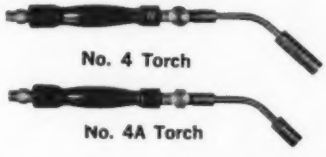
CABLE SPLICERS KIT

A. **491 Tip** — provides intense, broad flame.
B. **491-B Tip** — Small pointed flame, ideal for close work.
C. Pyramid type soldering iron tip. (Soldering iron tips adapt to 491-B Tip.)
D. Chisel type soldering iron tip.
E. Six-foot Auxiliary Hose Assembly 91-H.



This one-man Kit provides light, compact unit for wiping lead joints and repairing ring cuts. B-91 is refillable cylinder (.91 lbs. fuel) which is ideal for high line work. Torch-tip assemblies are attached to cylinder by six-foot hose.

TORCHES



No. 4 Torch

No. 4A Torch

Mutual LP-Gas Hand Torches are used by cable splicers for wiping joints, removing lead from sleeves, repairing terminals or wherever concentrated heat is needed. The same fuel source used for melting furnace or heater can be utilized.

No. 4 Torch — provides broad flame where heavy concentrated heat is needed.

No. 4A Torch — provides small pointed flame which is excellent for close work or small objects.

No. 2 Heater

HEATERS

This LP-Gas Heater is a convenient, light-weight, portable unit which provides heat for telephone crews. It can be used as cylinder mounted (No. 2) or base mounted unit (No. 2A). Heater can be used safely in aerial tent. Hose extends from heater to cylinder on ground. No regulator necessary. Develops 37,800 Btu.

No. 2 Furnace

FURNACES

Mutual's furnace is used on a cylinder or base. Cylinder mounted unit (No. 2) is popular for field work. Base mounted furnace (No. 2A) is useful when both melting furnace and heater are attached to cylinder at same time. No pumping or priming. Lights instantly. Works off tank pressure. No regulator is required.

SERVICE Propane Mutual Gas EQUIPMENT

Mutual LIQUID GAS EQUIPMENT CO., Inc.
17129 SOUTH BROADWAY, GARDENA, CALIFORNIA

Courts and Commissions

Carolina T&T Directors Ask 5-for-1 Stock Split

The board of directors of the Carolina Telephone & Telegraph Co., Tarboro, N. C., at a meeting on Sept. 11, recommended to the stockholders that the common capital stock be split on the basis of five shares for each outstanding share now held.

Under the change, for which approval is being asked from the North Carolina Utilities Commission, the par value of the present common capital stock will be reduced from $100 per share to $20 per share.

H. Dail Holderness, president, said the stock split proposal was made in order to secure a wider distribution of the company's capital stock. He stated that no increase in the dividend rate is planned because of the change in the par value of the stock.

Since 1945 the Carolina company has raised over 33 million dollars in new capital through the sale of common stock and will, based on continued development, need sizable amounts of new capital. The splitting of the stock will provide a stronger position for the company in the highly competitive market for capital funds in the future, Mr. Holderness concluded.

Stockholders will be asked to vote on the recommendation at a special meeting called for Oct. 23.

Minn. Switcher Responds to Growth with Graded Service

The Eagle Lake Telephone Co., a service station company, on Sept. 14 secured approval of an expanded schedule of rates from the Minnesota Railroad & Warehouse Commission.

The company serves an area about 5 miles from Northwestern Bell Telephone Co.'s Willmar exchange which switches the Independent's 154 stations. The commission noted that the Independent's territory includes Eagle Lake near which many new homes of Willmar people are being constructed, and that these people want a higher grade of telephone service than the rural multi-party service that has previously been available in the area.

Eagle Lake surveyed its subscribers and learned that one, two and four-party service were in demand. Then it negotiated with Northwestern Bell for such service.

The commission stated the company "has constructed, from Bell's base rate area cable terminal pole, a 51-pair cable through which the various higher grades of service may be rendered to its subscribers at uniform zone rates which are based upon Bell's Willmar class rates plus a uniform mileage charge for the various grades of service."

The Eagle Lake company's rural multi-party gross rate of $3.25 had been producing net operating revenues of $5,152, and a net loss of $2,685. The rate base of $29,000 included a current value adjustment amount.

Under the new schedule, net operating revenues will approach $9,372; net income of $1,322 represents a 4.55 per cent rate of return on the rate base.

Approved new gross rates (25-cent discount if paid by the 15th of the month) for the Eagle Lake company are:

One-party residence	$16.25
Two-party residence	11.25
Four-party residence	5.50
Six-party residence	3.50
Rural multi-party	3.25

Injunction Restrains Mich. Company's Service Expansion

Michigan Circuit Court Judge Charles J. Falahee has issued an injunction restraining the Southern Telephone Co., Brooklyn, Mich., from using public land in Spring Arbor township for the extension of its services.

The request for an injunction was filed by Attorney L. Russell Heuman of Jackson representing about 50 Horton-Spring Arbor area subscribers who own shares in the Horton Mutual Telephone Co.

They contend that the Brooklyn company intends to build a central office, switchboard and other facilities within Spring Arbor township, where they claim the Horton company has a franchise.

They asked the court that Southern's expansion be restrained until it obtains the consent of township officials as required by Michigan law.

Attorney Heuman said a poll indi-

HOW DO AUBURN TRENCHERS CUT THE PRICE of a GOOD DITCH?

- Low Initial Cost
- Less Maintenance
- Less Downtime
- One-man Operation
- Speed on the Job

When you see how the Auburn digs in soil conditions that no other trencher can, operates up to 800 feet per hour, and automatically adjusts speed to changing soil conditions, you'll understand why so many dollar-wise users buy Auburn. It has a simple, trouble-free design that has been proven through years of service.

Trenches 6 to 14 inches wide and down to 6 feet. Special bits are available for rock, shale, and frozen ground.

Auburn is the world's largest producers of trenchers.

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Tractor-mounted trenchers are available for M-F Work Bulls, IH Utility, John Deere Crawler and Wheel Industrial, and Ford Tractors.

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... prompt delivery too!

- **Low Shield Resistance**
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You can depend on Ansonia Ankoseal for Alpeth Cables made under rigid quality controls.

Ansonia Ankoseal Alpeth Cable is made in conformance with the latest REA specifications.

Ask for Ansonia Ankoseal Telephone Cable Literature

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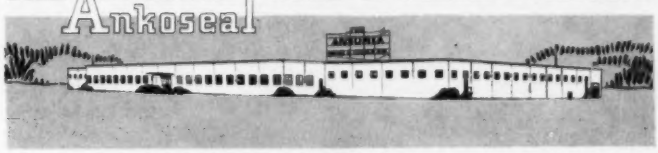

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"Leadership In Plastic Cables Through Quality and Service"

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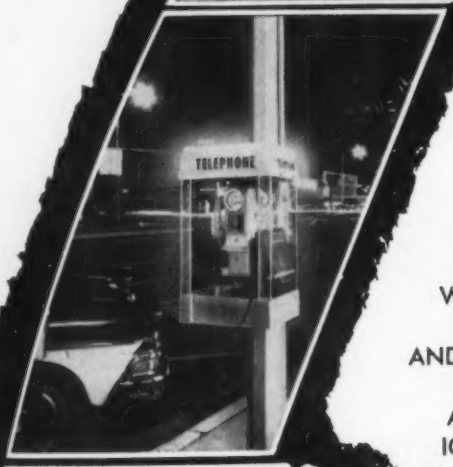
282-9

THROUGHOUT NORTH AMERICA, GLADWIN'S

"BOOTHETTE"

HAS STOOD THE TEST OF TIME . . . FROM SANDY BEACHES AND DRY WESTERN WINDS, TO THE WINTRY BLASTS OF THE FAR NORTH, THE BOOTHETTE IS A BRIGHT BEACON TO ALL WHO PASS—



APPROVED FOR INTRA-STATE HIGHWAY INSTALLATION, THE BOOTHETTE CHEERFULLY WITHSTANDS THE SALT AIR, SAND AND SPRAY OF THE COASTAL AREAS AS WELL AS THE ICY COLD BLASTS THAT SING DOWN ACROSS THE GREAT LAKES REGIONS. WHETHER IT BE FOR DRIVE-UP OR PEDESTRIAN INSTALLATION, CHEERFUL DEPENDABILITY IS A GLADWIN BY-WORD.

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Phone — JAckson 5-5384

cated that out of the approximately 270 Horton Mutual subscribers, about 160 are opposed to the Southern company entering the area.

Wis. Company Proposes EAS With Four Bell Exchanges

The North West Telephone Co., Tomah, which recently asked the Wisconsin Public Service Commission for a rate increase (TELEPHONY, Aug. 15), proposes the following extended area service arrangements:

From its Eagle exchange to its Mukwonago and Palmyra exchanges.

From Mukwonago to Eagle and the Wisconsin Telephone Co.'s (Bell) Waukesha exchange.

From its Delafield exchange to its Dousman exchange and Wisconsin Bell's Oconomowoc and Hartland exchanges.

From its Genesee exchange to its North Prairie exchange and to Waukesha.

From Dousman to Oconomowoc and Delafield.

From Palmyra to Wisconsin Bell's Whitewater exchange and to Eagle.

From its East Troy exchange to Mukwonago.

OK Home Pupil System; Sales Promotion Aid in Nebraska

The Nebraska Railway Commission on Sept. 9 authorized the General Telephone Co. of Nebraska, Columbus, to offer speaker-microphone systems for handicapped children unable to attend school.

Monthly rates will be $3.50 for home stations and $4.50 for school stations. Installation charges are $4.50 for home and school stations and $5.00 for portable stations.

•

On Sept. 12, the General company was allowed to waive and suspend service connection charges on a temporary basis. The company proposes to use this in sales promotion programs in four areas between Sept. 14 and Dec. 2.

Report Sale in Kansas

The KanOkla Telephone Association, Anthony, Kan., has purchased the Geuda Springs Telephone Co. It expects to convert the Geuda Springs exchange to automatic operation early in 1960. Geuda Springs serves 109 subscribers and 46 additional subscribers will be added when the cut-over is completed.

OK New Stock Price in Ore.

The Oregon Public Utility Commissioner on Sept. 11 granted the petition of West Coast Telephone Co. to amend its application to issue stock (TELEPH-

for your ready file

To meet new THW classification*

Monsanto OPALON 71345 vinyl compound

PHYSICAL PROPERTIES	UL SPECIFICATIONS FOR THW	TYPICAL TEST VALUES FOR OPALON 71345 (#14 AWG solid wire with 3/64" insulation)
1) Tensile Strength, psi	2000 min.	2550
% Retention (aged 7 days @ 113°C)	75 min.	105
2) Elongation, % Retention	150 min.	295
(aged 7 days @ 113°C)	75 min.	91
3) Deformation, T_2/T_1 (1 hr. @ 121°C, 500 gm. wt)	0.70	0.88
4) Vertical Flame Test	Pass	Passes
5) Heat Shock Test, 121°C.	Pass	Passes
6) Mechanical Water Absorption mg/in^2	20 max.	10-13

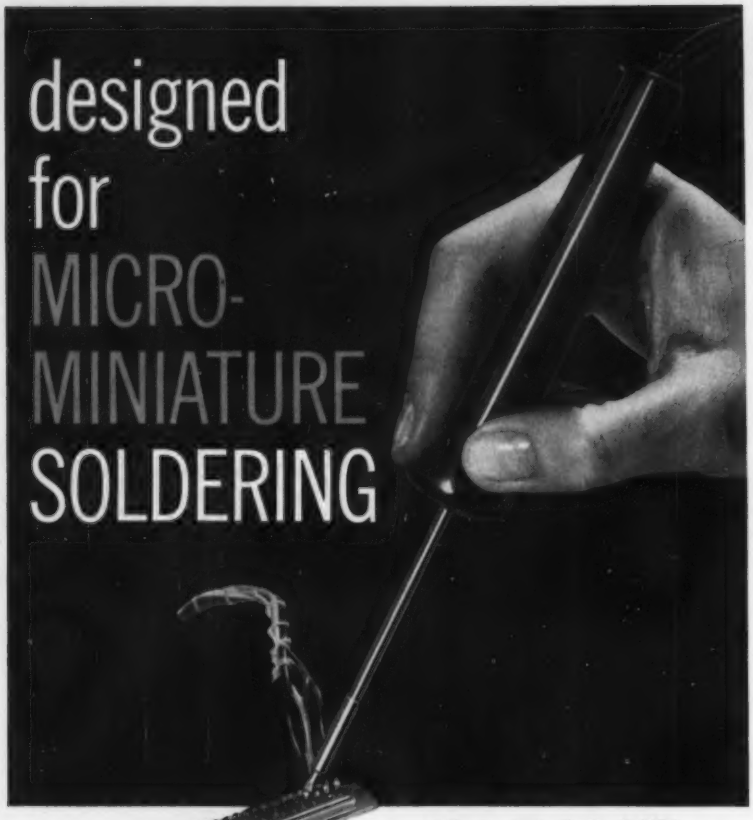
ELECTRICAL PROPERTIES	UL SPECIFICATIONS	OPALON 71345
1) Specific Inductive Capacitance		
1000 cycles at 75°C.	10 max.	7.4
1 day	5 max.	2.3
% change 7-14 days	10 max.	7.2
2) Insulation Resistance megohms/1000 ft.		
1 day at 15.6°C.	150 min.	4200
1 day at 75°C.	0.1 min.	6.1
1 week at 75°C.		4.8
10 weeks at 75°C.		5.5
28 weeks at 75°C.		5.6
3) Conductor Corrosion	None	None
4) Dielectric Strength, volts	3000	over
1 day at 15.6°C.		20,000

(1959 edition of the National Electrical Code of the National Fire Protection Association)

*Under the new THW classification, up to 20% more current can be run through conductors than could be with TW conductors. Smaller conductors can be used, saving conduit space, cutting wiring costs. Maximum operating temperatures raised from 60° to 75° C. Good electrical properties, moisture and heat resistance, aging characteristics, economical performance, processability and freedom from conductor corrosion, make Opalon 71345 ideally suited for THW usage. For complete technical and processing data on Opalon 71345 write to Monsanto Chemical Company, Plastics Division, Springfield 2, Massachusetts.

OPALON: REG. U. S. PAT. OFF.

Monsanto



. . . the T-12-XF
by **American Beauty**

The T-12-XF Transformer Type Electric Soldering Iron is a scientifically designed, finely engineered tool that is especially intended to do just the kind of soldering job you see being accomplished above.

Proven best-by-test on many similar applications . . . affords extreme flexibility . . . assures a high degree of protection to delicate, expensive electronic components because its hypersil type transformer provides complete line-voltage isolation.

The cord with which the T-12-XF is equipped is ultra-flexible . . . impervious to oil, water and grit.

Tips—elements are Armco ingot iron brazed to stainless steel casings . . . 3/32" (shown), 1/16", 1/8" and 1/4" tip diameters, all same casing diameters.

The featherweight, pencil type handle minimizes operator fatigue . . . is always comfortably cool.

AMERICAN BEAUTY Electric Soldering Irons Are Made In ONE Quality Only . . . The Best . . . And Only The BEST Gives You The MOST!

YOU CAN'T BEAT A SOLDERED CONNECTION

202-B

WRITE FOR 28-PAGE ILLUSTRATED CATALOG CONTAINING FULL INFORMATION ON OUR COMPLETE LINE OF ELECTRIC SOLDERING IRONS—INCLUDING THEIR USE AND CARE.

AMERICAN ELECTRICAL HEATER COMPANY
DETROIT 2, MICHIGAN

ONY, Sept. 19). The commission approved changing the minimum price to the company—of the 135,000 shares of $10 par common stock authorized—to $23 per share instead of the $24 previously set. The company estimates that its net proceeds from the stock sale will amount to $3,078,335.50.

Emergency Party Line Use Bill Approved in Wisconsin

A maximum fine of $500 for party line subscribers who refuse to give up the line in emergencies was provided in a bill signed into Wisconsin law Sept. 15 by Gov. Gaylord Nelson (TELEPHONY, July 11).

The new law defines an emergency as "a situation in which property or human life are in jeopardy and the prompt summoning of aid is essential."

It establishes identical penalties of $50 to $500 for persons falsely claiming an emergency in order to obtain use of the line.

Telephone companies are required to print a warning, outlining the penalties for refusing to relinquish a line in emergencies, in future telephone directories.

North Carolina Company Asks to Declare Dividend

The Heins Telephone Co., Inc., Sanford, asked the North Carolina Utilities Commission on Sept. 17 for permission to use $114,000 from its surplus earnings to declare a stock dividend of one share of $100 par value common stock for each share now held.

The company, which serves Sanford and adjacent areas, proposes to issue 1,140 shares of additional stock to match the number of shares now outstanding.

In its petition to the commission the company said it "has been growing very rapidly and demands for telephone service have far exceeded the estimated and anticipated growth."

It said the company paid no dividends from the time it was organized in 1930 until 1954 when it distributed a stock dividend of $57,000. Since 1954, dividends have been paid three times, 5 per cent one year and 7 per cent in two years.

FCC Refuses Bell Plea For Ship-to-Shore Services

The Federal Communications Commission on Sept. 9 rejected the applications of the Wisconsin Telephone Co. (Bell), the Ohio Bell Telephone Co., and the Michigan Bell Telephone Co. to build nine new ship-to-shore radio-

(Please turn to page 112)

When the Elyria, Ohio, Telephone Co. expanded its underground system to continue its program of long-distance direct dialing, Anaconda Stalpeth did the job. And did it quicker, more easily and at less cost than ordinary paper-lead cable.

ANACONDA STALPETH THE LIGHT-WEIGHT PAPER-INSULATED TELEPHONE CABLE THAT'S A "HEAVYWEIGHT" IN SAVINGS AND PERFORMANCE!

Lower initial costs . . . lower shipping costs . . . lower installation costs . . . lower maintenance costs—you get them all with Anaconda Stalpeth, the paper-insulated telephone cable that's 30% to 50% lighter than ordinary paper-lead cable!

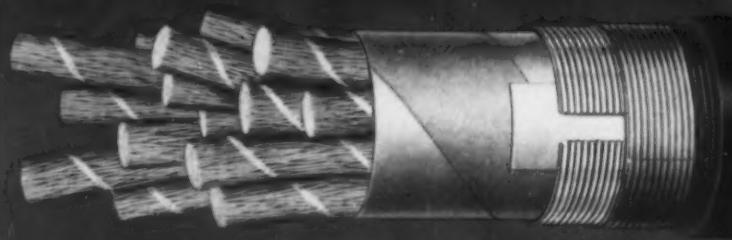
Anaconda Stalpeth comes by its money-saving light weight because its sheath is made of STeel, ALuminum and PolyETHylene. The result is a cable that offers new economy, new ease of handling. It permits longer pulls through ducts and quicker aerial installation.

Once installed, Anaconda Stalpeth turns in steady, dependable performance—thanks to the outstanding electrical and mechanical properties built into it at the factory. Anaconda's rigorous quality-control setup is a double-check: each conductor is individually inspected as it comes out of the insulating machine, and every pair is tested. Thorough in-process control eliminates need for costly, time-consuming field inspection.

In addition there are other important advantages: (1) Anaconda Stalpeth's polyethylene jacket offers electrical protection from falling power lines. Prevents power faults which could damage lead-sheathed cable. (2) Its high-molecular-weight polyethylene jacket prevents corrosion problems often encountered in ducts. (3) The electrical characteristics of Anaconda Stalpeth have been engineered to the high standards of all Anaconda cable: minimum conductor resistance . . . high insulation resistance . . . maximum dielectric strength . . . low-resistance shield—traditional paper quality with new economic light-weight sheath.

Consider this modern, light-weight, economical cable for your telephone needs. Behind its manufacture stands Anaconda's 50 years of experience in the production of paper-insulated cables, the latest in manufacturing equipment and testing devices. Distribution points across the country mean fast delivery and service. Anaconda Wire & Cable Co., 25 Broadway, New York 4, New York.

For further facts on Anaconda Stalpeth see other side . . .



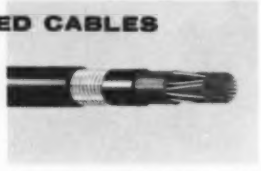
STALPETH CONSTRUCTION. *Insulation:* Single-wrap paper tape applied with an overlap. *Color Coding and Assembly:* Coded by standard color groups in all constructions. Layer construction 51, 76 and 101 pairs; unit construction 76, 101, 152, 202, 303, 404, 606, 909, 1212, 1515, 1818 and 2121 pairs. For 19 Awg and 22 Awg—insulated conductors are twisted into pairs having 10 different pair twists; for 24 Awg and 26 Awg—they are twisted into pairs having 5 different pair twists. The pairs are stranded into units. The units are assembled as shown. Cable core is covered by two thicknesses of paper tape. *Sheath:* Anaconda Stalpeth sheath is composed of aluminum tape, coated-steel tape and a high-molecular-weight polyethylene jacket overall. The inner .008-inch aluminum tape is applied longitudinally with a slight gap, corrugated for flexibility in large diameter cables. The low d-c resistance of this tape when properly grounded limits the effect of induction from power lines and reduces possibility of damage to cable from lightning. The outer .0072-inch corrugated coated-steel tape is also applied longitudinally, but with an overlap, and is soldered to form a tight metallic seal. It provides maximum protection to the cable core against possible moisture diffusion through the outer polyethylene jacket. The outer jacket is composed of high-molecular-weight polyethylene which is highly resistant to abrasion, weathering, moisture, corrosion, and environmental cracking. *Shipment:* Each length is wound on a separate reel, with each end sealed to prevent entrance of moisture. Each reel is fully lagged.

TEAR OUT FOR YOUR FILE

IN ADDITION TO STALPETH, ANACONDA MANUFACTURES THIS FULL LINE OF SUPERIOR TELEPHONE CABLES

PLASTIC-INSULATED CABLES

Anaconda Alpeth Type ALP Aerial & Duct Cable (No. 19, 22 & 24 Awg). Polyethylene insulated; full color code; 8-mil longitudinal aluminum shield; high-molecular weight polyethylene jacket.



Anaconda Type PCP Direct-Burial Cable (No. 19, 22 & 24 Awg). Polyethylene insulated; full color code; polyethylene belt; 5-mil longitudinal copper shield; polyethylene jacket.

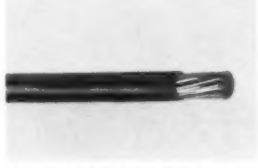
Anaconda Type BW Buried Distribution Wire (No. 19 & 16 Awg). Two conductors, parallel; insulated with polyethylene; oval in shape; flat-steel wire serving, asphalt coating, Densheath® jacket.

Anaconda Type RD Rural Distribution Wire (No. 19 Awg). Conductors insulated with polyethylene, jacketed with color-coded Densheath; pairs assembled around polyethylene-covered support wire.

Anaconda Type SD Suburban Distribution Wire (No. 22 Awg). Conductors insulated with polyethylene, jacketed with color-coded Densheath; pairs assembled around polyethylene-covered support wire.

Anaconda Type UD Urban Distribution Wire (No. 24 Awg). Densheath-insulated conductors; color-coded pairs assembled around polyethylene-covered support wire.

Anaconda Type CR Single Pair Parallel Distribution Wire (No. 14 Awg & .080" Copperweld). Two conductors parallel; insulated with high-molecular weight polyethylene, oval in shape.



Anaconda Type IC Inside Telephone Cable (No. 22 & 24 Awg). Densheath-insulated inside telephone cable; nonfading color-coded pairs with corrosion-resistant Densheath jacket overall.

PAPER-INSULATED CABLES

Anaconda Type PL Paper-Lead Cable (No. 19, 22, 24 & 26 Awg). Single-paper-tape insulated telephone cable, paper core covering over assembled pairs; antimony-lead sheath overall.

Anaconda Type PLP Paper-Lead Polyethylene Protected Cable (No. 19, 22, 24 & 26 Awg). Paper insulated, paper core covering, assembled pairs; antimony-lead sheath, polyethylene jacket.

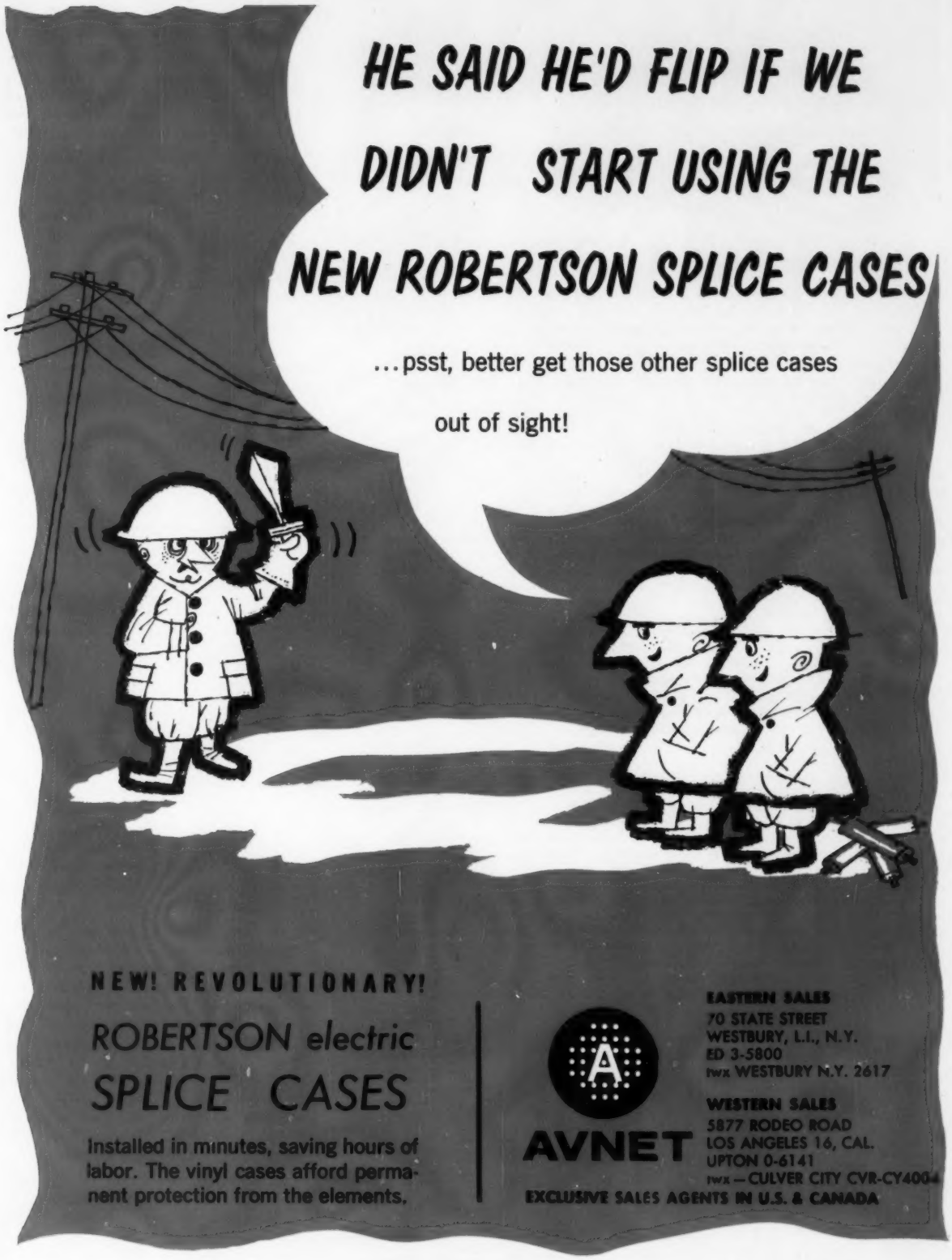
Anaconda Type PLJ Paper-Lead, Jute-Protected Cable (No. 19, 22, 24 & 26 Awg). Single-paper-tape insulated, paper core covering over assembled pairs; antimony-lead sheath; jute serving overall.

Anaconda Type PLBT Paper-Lead, Tape-Armored Cable (No. 19, 22, 24 & 26 Awg). Paper insulated; antimony-lead sheath; impregnated-paper tape; jute; flat-steel tapes; nonadhesive coating.

PHONE THE MAN FROM **ANACONDA®** FOR TELEPHONE CABLE

the independent manufacturer for the independent telephone industry

•Reg. U. S. Pat. Off.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...psst, better get those other splice cases out of sight!
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ROBERTSON electric SPLICE CASES
Installed in minutes, saving hours of labor. The vinyl cases afford permanent protection from the elements.
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. . . Measures absolute amplitude and relative delay characteristics of 600 ohm transmission circuits from 200 cycles to 24 kc. Temperature range 32°F to 130°F with 60 cycle line voltages from 105 to 125 volts. Overall precision and accuracy ±50 microseconds. Drift rate not exceeding ±50 microseconds per 30 minutes.

SPECIFICATIONS OF THE 451-A TRANSMITTER

CARRIER SWEEP RATE: Carrier frequency controlled manually or by a motor driven sweep capacitor at two sweep rates:
a. 1 cycle per 10 seconds, or 6 rpm.
b. 1 cycle per 100 seconds, or .6 rpm.

CARRIER FREQUENCY: Continuously adjustable from 200 cycles to 12 kc. The sweep width and position is adjustable within the 200 cycle-12 kc. limits. The minimum sweep width is 1500 cycles. An external oscillator can be used up to 24 kc.

REFERENCE FREQUENCY: Means are provided for switching the carrier frequency (normally controlled by the sweep capacitor) to a reference frequency anywhere in the 200 cycle to 12 kc. band.

MODULATION FREQUENCY: 25 cycles, derived through counting circuits from tuning fork control oscillator. 2 kc. tuning fork stability ±3 ppm at room temperature.

FREQUENCY METER: Carrier frequency continuously indicated on a direct-reading meter with an error not exceeding ±2.5% of full scale. Frequency meter calibration can be checked by inserting a 2 kc. signal from the local fork oscillator circuit.

TRANSMITTER OUTPUT SIGNAL: Output level adjustable in 5 db steps from −20 dbm to +10 dbm. These figures represent the peak power in the 50% modulated output signal applied to the output terminals. Maintains internal impedance of 600 ohms ±10 ohms from 200 cycles to 24 kc. The frequency characteristic of the output terminals is flat to within ± .25 dbm from 200 cycles to 24 kc.

TRANSMITTER SYNC. OUTPUT: 2 kc. signal can be used as a common time base in both the transmitter and receiver.

SPECIFICATIONS OF THE 452-A RECEIVER

INPUT IMPEDANCE: Internal impedance is 600 ohms ±10 ohms from 200 cycles to 24 kc.

INPUT LEVEL: The receiver will perform satisfactorily over the range from +10 dbm to at least −30 dbm by use of the manual attenuator control and operate over any 20 dbm range within the specified limits without change in the attenuator control. The input-level is indicated algebraically by an input attenuator calibrated in dbm and level meter calibrated in dbm. The meter range is 20 dbm; the attenuator range is 25 dbm in 2.5 db steps. All readings are peak input power to the receiver.

DELAY MEASUREMENTS: Delay is indicated on a relative basis, reference being to a cardinal point in the frequency band between 200 cycles and 24 kc. Measurements are obtained from a direct-reading meter which has two sensitivities: 2 ms and 20 ms full scale. The 0 to 2 ms range may be positioned anywhere in the 0 to 20 ms scale by means of a coarse control which adds or subtracts precise 500 microsecond increments of delay in the reference channel. A fine control is provided to obtain cardinal point adjustment.

FREQUENCY METER: Same as Transmitter.

AMPLITUDE TO PHASE CONVERSION: With a 20 db change in amplitude, the output delay indication will not change by more than ±50 microseconds.

TYPE 328-A TRANSISTORIZED PHASE METER

• Compact • Long-Time Stability • Phase Accuracy 1° From 10 Cps To 10 Kc • Frequency Range 10 Cps To 50 Kc • Direct Reading From 0° to 360° In 6 Ranges Of 60° Each On 5" Meter Scale.

Measures the phase angle in degrees between two sinusoidal or nonsinusoidal voltages. Amplitude range .25 to 170 volts peak except at low frequencies. Connector provided for recorder. Terminals provided for operation with external 45 volt battery. Power supply 105-125 volts 60 cycle A.C.

TYPE 7000-B AUDIO PRIMARY PHASE STANDARD

• Based on Frequency Division and Expanded Lissajous Presentation Extreme Accuracy.

Generates two sine waves having variable phase relation 0° to 360° which can be set to within ±0.01°, at any specified single frequency 60 cps to 20 kc. Angles which are multiples of 1° can be set to ±0.01°. Used for accurate phase calibration or measurement.

ACTON LABORATORIES, INC., ACTON 6, MASSACHUSETTS

A Subsidiary of Technology Instrument Corporation, Acton, Mass.

COlonial 3-7756 — Boston Line Liberty 2-2681

telephone stations on the Great Lakes.

The commission upheld an examiner's findings that the present service was adequate for foreseeable needs.

Wisconsin Bell had asked for new stations at Milwaukee and Green Bay; Ohio Bell at Cleveland and Toledo, and Michigan Bell at Hancock, Escanaba, East Tawas, Port Huron and Marquette.

In their applications, the companies said it was expected that the new St. Lawrence seaway would generate enough traffic and telephone use demands by crews and passengers to justify a second system.

Service is now provided by Lorain County Radio Corp. through stations at Port Washington, Wis., Duluth, Minn., and Lorain and Geneva, O.

The Central Radio Telegraph Co. maintains a station at Rogers City, Mich.

Oregon Company Gets Raise For EAS

The Malheur Home Telephone Co., Ontario, on Sept. 16 was given permission by the Oregon Public Utility Commissioner to provide extended area service and to raise rates by $99,371.04 (TELEPHONY, Apr. 11).

The company, presently converting its Ontario exchange to dial operation, will shortly have 100 per cent dial service at all of its three exchanges, Vale, Nyssa and Ontario.

The extended area service which will be offered, will make toll-free service available between contiguous exchanges on the Oregon and Idaho sides of the Snake River.

This service will be available between Ontario and Vale, Ontario and Oregon Slope, Ontario and the Payette, Ida. exchange of the Mountain States Telephone & Telegraph Co., Ontario and Nyssa, and Vale and Nyssa.

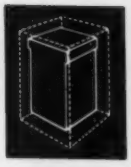
This will increase the calling area of Vale subscribers to 6,300 telephones, more than five times the number they can now call without a toll charge. Nyssa, which now has approximately 1,700 stations, would be able to call 6,300. Ontario, which presently has about 3,600 telephones in its calling area will have more than 9,200 telephones available. Oregon Slope subscribers who can now call approximately 3,500 telephones will be able to reach 6,800 without toll charges.

In a survey of 2,600 of its subscribers, including all business subscribers, the Malheur company found that less than 1 per cent of those surveyed, were critical of the proposal.

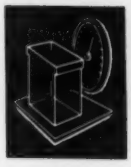
The company also distributed a pam-

all new! **gould** *stationary batteries in plastrite jars!*

SAVES 30 TO 40% FLOOR SPACE. You can increase your battery room capacity without increasing the room size just by installing new Gould Batteries in Plastrite Jars.



EASIER TO HANDLE. You will find it easier and quicker to move batteries in your battery room; shipping and handling costs are lower because of the reduced weight of these new batteries.



NEW PLASTRITE JARS NEVER LOSE SHAPE . . . never bulge or warp because Plastrite has 15 to 30% higher resistance to heat distortion and 50% higher elongation characteristics than other stationary battery jars.

HIGHER IMPACT RESISTANCE, TOO. Normal handling shocks and shipping abuse will not harm the new Plastrite Jar which has a higher tensile strength.

Defies electrolyte seepage. New Silicone O-ring post seal expands under compression, forming a tight seal against the cover wall of the battery. This prevents escape of electrolyte, eliminates discoloration of battery cover.

New stronger posts assure full current-carrying capacity, permit convenient assembling of cells end-to-end or side-to-side.

New element suspension eliminates cover breakage due to weight of battery element.

Take advantage of the benefits offered by Gould's new Stationary Batteries in Plastrite Jars. They're available in Planté, Calcium, and Kathanode types . . . in capacities for every need. Write today for new illustrated catalogs, or call your local Gould office listed under "Batteries—Industrial" in the "Yellow Pages." Gould-National Batteries, Inc., Trenton 7, N. J.

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RADIO SYSTEMS

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CORPORATION
325 FAIRFIELD AVE., STAMFORD, CONN.

phlet explaining the details of extended area service.

In granting the increase, the commission said it would be more economical to provide the facilities necessary for toll-free calling in connection with the major dial conversion project at Ontario, rather than postpone their installation for a later date after the dial conversion is completed. The company did engineer the dial conversion and extended area service together as a single project.

With the advent of this EAS, the company will originate some 286,000 fewer toll calls per year which will result in a savings in toll charges to its subscribers of $49,450.

The new service will make possible a future tie-in with the nationwide direct distance dialing network.

The company has had an increase in investment from $201,490 in 1945 to $1,623,784 in 1958. With the new facilities, estimated investment will reach $2,034,641.78.

Under the new rates, net operating income will be $123,457.79 instead of $79,586.50, giving the company a 6.17 per cent rate of return instead of the 3.98 per cent return it had under old rates.

Net operating income will increase $43,871.29.

Old rates are as follows:

	Exchange Service	Average Toll Service*	Total
Ontario:			
One-party business	$9.50	$2.86	$12.36
Two-party business	7.00	.78	7.78
Suburban business	5.50	.77	6.27
Farmer line business	2.25	—	2.25
One-party residence	5.50	.67	6.17
Two-party residence	4.50	.37	4.87
Four-party residence	3.50	.44	3.94
Suburban residence	3.75	.67	4.42
Farmer line residence	1.50	.17	1.67
Nyssa:			
One-party business	7.50	1.80	9.30
Two-party business	5.75	.77	6.52
Suburban business	5.00	.75	5.75
One-party residence	5.25	.58	5.83
Two-party residence	4.25	.27	4.52
Four-party residence	3.50	.24	3.74
Suburban residence	3.75	.42	4.17
Farmer line residence	1.50	1.00	2.50
Vale:			
One-party business	7.50	3.86	11.36
Two-party business	5.75	1.63	7.38
Suburban business	5.00	1.83	6.83
One-party residence	5.25	1.15	6.40
Two-party residence	4.25	.60	4.85
Four-party residence	3.50	.34	3.84
Suburban residence	3.75	.68	4.43

*The toll service referred to is provided between Ontario, Nyssa and Vale.

New rates for EAS are as follows:

Ontario:	
One-party business	$15.25
Two-party business	10.25
Suburban business	7.75
Farmer line business	4.00
One-party residence	6.65
Two-party residence	5.50
Four-party residence	4.70
Suburban residence	4.95
Farmer line residence	3.00
Nyssa and Vale:	
One-party business	$11.50
Two-party business	8.75
Suburban business	6.75
One-party residence	6.25
Two-party residence	5.25
Four-party residence	4.50
Suburban residence	4.75
Farmer line residence	2.75

The Malheur company's common stock is owned by Mountain States Telephone & Telegraph Corp.

R. E. Joslin, General of NW Vice President—Revenue

Robert E. Joslin has been elected vice president-revenue requirements of General Telephone Co. of the Northwest, Spokane, according to A. J. Barran, president. In addition to his new position as vice president, Mr. Joslin will assume duties as general commercial manager for the company.

His assignment as commercial manager will fill the vacancy created by George M. White, who is currently engaged in special studies of organization and methods of the company's operation.

Robert F. Williams, also of Spokane, was elected secretary-treasurer. He will continue to serve in his present capacity as public relations director of General of the Northwest, in addition to his new duties, Mr. Barran reported.

Incorporate in Nebraska

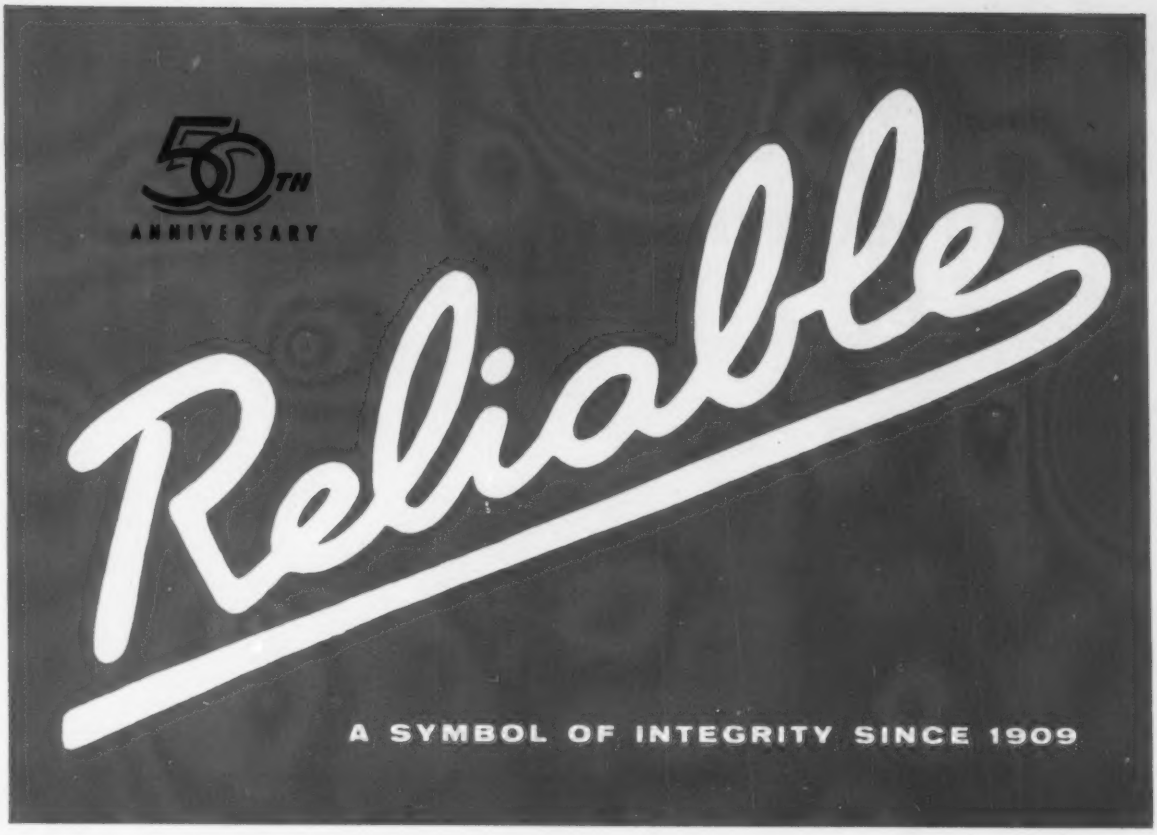
The Sheep Creek Telephone Co., Agate, on Sept. 11 filed articles of incorporation with the Nebraska Secretary of State. Incorporators are Emil J. Murphy Jr. of Agate, Joseph M. Lee, Vance Johnson, Albert Lee, Samuel A. Moore, James E. Elliott and E. C. Douglass, all of Mitchell.

Set Rate Appeal In Neb.

A hearing was set by the Nebraska Railway Commission for Oct. 7 on the application of the Capitol Telephone Co., Hickman, for approval of its tariffs covering local, general and long distance service, rates and charges, and to correct the Hickman exchange area boundary map.

Correction

The 1960 convention of the Kansas-Missouri Telephone Association will be held on May 23 and 24. TELEPHONY inadvertently reported these dates as May 24 and 25 in its convention calendar which appeared in the Sept. 5 issue.



Splice Cases and Splice Case Terminals... Drop Wire Clamps... Ready Access Cable Terminals and Closures ... STRANDLINK® and STRANDVISE®... *SQUEEZ*® Sleeves... Indoor and Outdoor Station Protectors... Protected and Unprotected Cable Terminals and Blocks... *SQUEEZ*® Tools... High Voltage Protectors... Fuses... Protected and Unprotected Wire Terminals and Blocks... Wirelink and Wirevise... Cable Hangers ... Fuseless Protectors... Splicing Sleeves... Arresters

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Rural Protection
MEANS
COOK PROTECTION
WITH BUCKEYE SERVICE

RDW Tap

A logical and economical method of connecting subscriber drops to rural distribution wire running straight through the Cook RDW TAP.

This unit provides a low-cost maintenance test point, and additional drops can be installed without opening splices or installing additional equipment. Size range in 6, 11 and 16 pair capacities.

Protection is optional but can be added later on a pair by pair basis with Cook Minigap arresters.

Catalog No. 352-1610

POWER CROSS PROTECTORS

5 CIRCUIT

This heavy duty arrester has been developed for telephone protection when there is a joint occupancy of poles by communication and power circuits. It provides a single assembly for 5 circuits requiring only one ground wire. The pigtail leads are precut to correct lengths for convenient installation. Catalog No. 501-50

SINGLE CIRCUIT

The miniature member of the family is also used in the event of contact between the power and communication circuits, in addition to furnishing considerable protection from lightning damage. This protector is furnished with alloy cover, a bracket for mounting and 3 copper wire leads.

Catalog No. 501-40

BUCKEYE TELEPHONE & SUPPLY CO.

1250 KINNEAR RD. COLUMBUS 21, OHIO

Newsmen Get Direct Service In Chile From IT&T Affiliate

News correspondents covering the recent Foreign Ministers conference in Santiago, Chile, enjoyed a unique service—communication with their home offices direct from the floor of the meeting itself, according to John T. Naylor, vice president of International Telephone & Telegraph Corp.

ITT's radio operating subsidiary in Chile, the Compania Internacional de Radio, S.A., (CIRSA) was the only international carrier to provide these facilities at the conference site, the Hotel Carrera, Mr. Naylor said.

Two international Telex booths were installed by CIRSA on the floor of the conference. Each was equipped with printer machines for automatic transmission.

Thousands of words were transmitted from correspondents representing every major news service, Mr. Naylor said. In addition to the lines from the conference floor, counter service, with a printer perforator position was provided on the third floor of the hotel, where the correspondents were housed.

A special Santiago-New York circuit also was established through Lima, Peru, Mr. Naylor explained, to expedite transmission of dispatches. This circuit provided facilities for either Telex or ordinary message service.

Still another service, added Mr. Naylor, was expansion by CIRSA of its entire radio-telephone schedule to permit filing of late news developments.

A special broadcast booth for radio correspondents was installed by CIRSA in its radio-telephone control office, and arrangements also were made for point-to-point news broadcasts from a local radio station, Radio Mineria.

Mauritius Radio Link

Mauritius, a British Island in the Indian Ocean, which has been isolated telecommunications-wise from the mainland of Africa, recently was linked by radio-telephone with East Africa, London, and Paris. In Nairobi, the postmaster general of the East Africa high commission, H. O. Ellis, was able to speak to Mauritius' director of telecommunications. Calls were also placed to London and Paris.

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Model 833-4S—only 28 ½" O.A.

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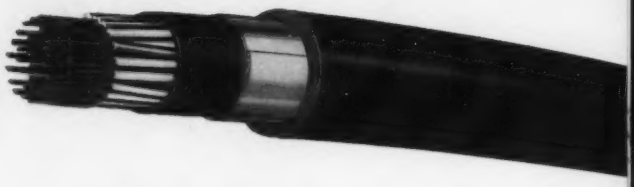
DIAL 212—ST 4-3690

PRESSED & WELDED STEEL PRODUCTS CO., INC.

38-61 11th Street — Long Island City 1, New York

AERIAL AND DUCT TYPE



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THE "MINE-TO-MARKET" QUALITY

Exchange Area Telephone Cable

This Phelps Dodge cable, designed for aerial, duct and direct burial use, has a lightweight, thermoplastic construction—including fully color coded conductors—that makes handling easier and cuts installation time.

Exceptionally fine electrical properties and superior resistance to moisture, weathering and abrasion are assured through the use of highest grade materials, skilled workmanship and manufacturing experience.

The controlled craftsmanship and high quality of Exchange Area Telephone Cable are typical of the entire line of Phelps Dodge telephone wires and cables including:

- Self-Supporting Telephone Cable
- Rural and Urban Distribution Telephone Wire
- Interior Telephone Cable
- Rubber-Insulated Lead-Sheathed Telephone Cable
- Paper-Insulated Lead-Sheathed Telephone Cable
- PD-Tel Wire

AND CABLE

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PD

It's New!

NOW–AT LAST A MEASURING WHEEL THAT MEASURES ACCURATELY TO A FRACTION OF AN INCH!

Rolatape's amazing new Model 415 meets all your measuring needs — measuring quickly and surely over the most uneven and irregular terrain with no risk of human error. This time-saving instrument is calibrated to measure accurately in full view of operator as it is rolled along, giving measurements in inches (to ½ inch) on one side of measuring wheel, and tenths of a foot (to .5 of a foot) on the other. Sturdy and lightweight, it is equipped with automatic brake and built-in stand. Handle folds compactly. See one at your dealer's today.

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HOW TO ORIENT NEWCOMERS

Concluded from page 86

must know who to ask if information is needed.

"We were having a terrific turnover among new office girls," an executive pointed out. "We couldn't figure out what was happening until we made a very close investigation. We found the older employes were cool and aloof to all new employes for several weeks and the new girls were lost on the job.

"Management was just about as bad and hid back in its little ivory towers. The average new girl, and particularly the girl on her first job, just didn't know where to turn."

(9) *Positive Approach*—It also pays to speak positively instead of negatively in briefing new employes on any point. Say *do* and seldom *don't*.

(10) *Undue Attention* — One should always make certain he doesn't "overdo it" in attention to the new employe. This may create an unfavorable attitude toward that person from others on the staff.

Book Tells Technicians How To Increase Creativity

Practical guide-posts for increasing creativity of scientists and engineers are the subject matter of "How To Increase Your Creative Output." The booklet is specifically designed to help companies raise the level of creativity of their technical personnel, and is written for the individual technical man.

All phases of creativity are included within the study. It discusses stages in the creative process, the problem approach, and a general preparation for creative work.

A special feature in the booklet is a two-page flow chart explaining the 12 essential steps in the creative process. How to prepare for creative work, suggestions for stimulating creative effort, and a creative checklist are also provided.

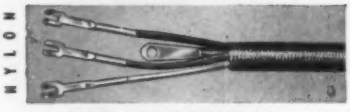
"How To Increase Your Creative Output" was prepared by Deutsch & Shea Inc., technical manpower consultants. It is one of a series of publications on creativity; others include "Creativity: A Comprehensive Bibliography," and "Company Climate and Creativity."

Special quantity rates are available for "How To Increase Your Creative Output," published by Industrial Relations News. Single copies are $1.50. The 22-page booklet may be ordered from Industrial Relations News, Book department, 230 West 41st St., New York 36, N. Y.

CORDS BY *Runzel*

YOUR

BEST



BUY!

Are you familiar with the features of these fine cords?

NEOPRENE covered cords are a highly serviceable cord, extensively used in a wide variety of services. They are moisture and grease proof . . . easy to keep clean.

NYLON covered cords are a relatively new development in telephone cords. Their fine smooth texture makes them the preferred cords for switchboard use. They give long service. Preferred by operators because of their fast, easy handling.

COTTON cords are in standard use everywhere. Their fine woven wrap makes them very serviceable for all around purposes.

Take your choice—Neoprene, Nylon or Cotton. They're all high quality cords made in accordance with Runzel high standard of quality. We carry a large stock of cords for every purpose.

Our geographical location means QUICK SERVICE.

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4723 W. MONTROSE AVE.
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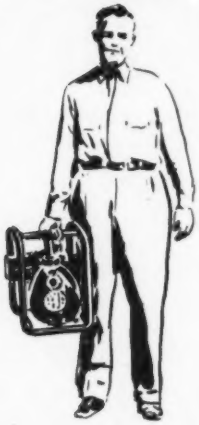
New!

THE HALE

"TORRENT"

Model 20-T

A 7000 gph. pump designed exclusively for Telephone System Service!



The Hale "TORRENT" Model 20-T is designed for fast priming, maneuverability, dependable pumping action, and rugged, maintenance-free operation.

- Easily Handled by *One Man* . . . weighs only 63 lbs. (in frame), yet ruggedly constructed. One-inch tubular steel "wraparound" frame* gives ample protection to engine accessories and yet allows easy access to all service openings.
- Pumps up to 7,000 U.S. gph. with ample reserve. Simple pump design for trouble-free, maintenance-free operation. No gasket construction: Self-adjusting, self-lubricated seal requires no greasing; Impeller clearance can be adjusted externally —no need to dismantle pump; Any pump part may be serviced or replaced by removal of only four studs.

*Available without frame—54 lbs.

Now...another TORRENT

30-T 3"

Pumps 20,000 gph.

Weighs only 143 lbs.

HALE FIRE PUMP CO.
CONSHOHOCKEN, PA.

Hale Fire Pump Company
Conshohocken, Pa.

Please send complete information.

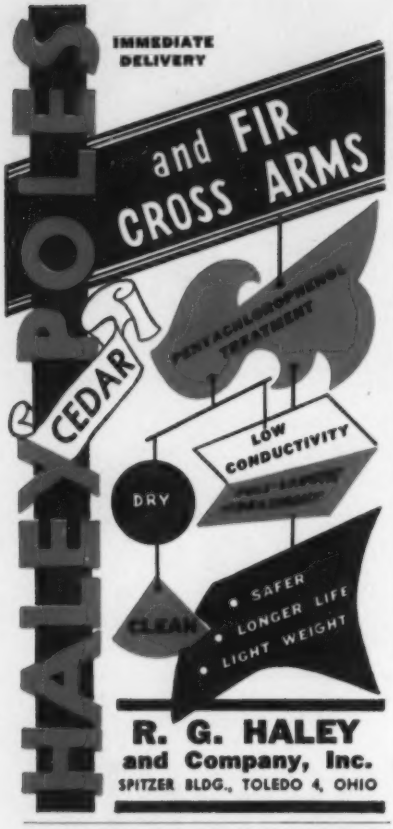
☐ I'd like the names of some leading companies now using the 20-T "Torrent."

Company_____

Name_____

Title_____

Street Address_____ Town_____ State_____



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Junior Achievement Do-It-Yourself Kit Available.
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Sears Opens Telephone Sales Shop in N. Y. Bus Terminal

The importance of telephone ordering has long been recognized by Sears Roebuck & Co. which recently opened a Telethrift shop in the Port of New York Authority bus terminal, which serves some 200,000 commuters daily.

The shop is a telephone order center equipped with mail order catalogs and 11 direct-line telephones connected to the Sears main sales building.

Orders will be relayed by teletype to the company's Philadelphia mail order plant and merchandise will be delivered within 24 hours either to the bus terminal or a Sears store near the shopper's home.

Robert W. Watson, general manager of Sears Philadelphia plant emphasized that catalog and telephone shopping is increasing more and more as parking problems become more difficult in suburban centers and as growing assortments of merchandise make it impractical for stores to carry complete stocks.

He noted that 40 per cent of Sears business in the New York area is done by telephone.

Elect J. L. Black President Of Canadian Independent

Joseph Laurence Black has been elected president of the New Brunswick Telephone Co., St. John, Canada, succeeding George M. McKeil.

Mr. Black is president of J. L. Black & Sons, Ltd.

He is a graduate of the Royal Military College at Kingston, Ont. and from 1921 to 1940 he served in the militia.

During World War II he was with the Canadian Army overseas and retired from active duty in 1945 with the rank of lieutenant colonel.

His father, the late Senator F. B. Black, served as president of the company for more than 20 years.

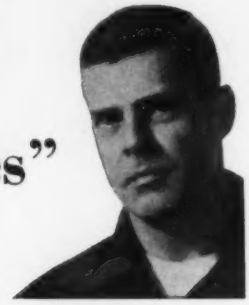
The New Brunswick company serves more than 115,000 stations.

Private Industry Expands Peru's Telephone Service

Privately-owned telephone systems in Peru are expanding their facilities although a shortage of service seems inevitable for many years to come, according to a report from the U. S. Embassy in Peru.

Total number of telephones in use in 1958 reached 93,811 as compared with 81,438 in 1957, or a total of 12,373 units added during the year. The Lima

"Why Nurse Old Poles"



Chuck Bradley
Osmose Pole Inspector

Some of my friends from Forestry School days give me quite a ribbing about my job of "nursing" old poles.

Frankly, I don't think that any of them have a job as important as mine. We inspect and treat in-place older standing poles. In doing this job well, we save linemen from accidents, prevent service interruptions, and save our customers big chunks of money by avoiding unnecessary replacements.

If you would like to know more about our important service, drop us a line.

Chuck Bradley

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Joslyn's use of corrosion resistant Copper-Alloy Steel in pole line hardware (furnished at no extra cost) is the best solution to date. It helps reduce corrosion failures in pole line hardware to prolong service life and provides more dependable installations.

This is a step in the right direction. We are continually conducting research and field testing to supply you with quality pole line equipment that assures uninterrupted service, reduces maintenance, and lowers operating costs. You can't test quality into a product, it has to be manufactured into it. At Joslyn we do just that.

paralleling electrical progress for 56 years!

LIVE BETTER ELECTRICALLY

JOSLYN COMPLETE POLE LINE EQUIPMENT

JOSLYN MFG. AND SUPPLY CO. • 155 N. WACKER DRIVE • CHICAGO 6, ILLINOIS

Operating Divisions of
Central Telephone Company
and Affiliates

La Crosse Telephone Corporation
Lexington Telephone Company
Middle States Telephone Company of Illinois
Virginia Telephone & Telegraph Company
Southeastern Telephone Company

One of the larger independent telephone systems operating 159 exchanges, serving 287,593 company-owned stations on June 30, 1959, of which over 87% are dial-automatic.

PUBLIC SERVICE CENTRAL TELEPHONE SYSTEM

Telephone Exchanges of:

- ● Central Telephone Company
- ● La Crosse Telephone Corporation
- ■ Lexington Telephone Company
- ● Middle States Telephone Company of Illinois
- ● Virginia Telephone & Telegraph Company
- □ Southeastern Telephone Company
- — Owned Interconnecting Telephone Lines

DUANE T. SWANSON
Vice President
and
Virginia Division Manager
Virginia Tel. & Tel. Company
Lexington Telephone Company

VIRGINIA

Front Royal, Washington, Luray, Shenandoah, Stanardsville, Crozet, Charlottesville, Scottsville, Palmyra, Fork Union, Brownsburg, Lexington, Natural Bridge, Glasgow, Scherley, Buena Vista, Buckingham, Farmville, Dillwyn, Burkeville, Crewe, Hampden-Sidney, Altavista, Victoria, Blackstone, Kenbridge, South Hill, Bradnax, La Crosse, Halifax, South Boston

ALLEN E. LINDEKUGEL
Minnesota Division
Manager
Central Telephone Company

MINNESOTA

E. B. SAMP
Vice President
and
Wisconsin Division Manager
La Crosse Telephone Corporation

WISCONSIN

WILSON B. GARNETT
North Carolina Division
Manager
Central Telephone Company

NORTH CAROLINA

Boone, Mt. Airy, Leaksville-Spray, Roaring Gap, Draper, Pilot Mountain, West Jefferson, Elkin, Boonville, North Wilkesboro, Yadkinville, Mocksville, Asheboro, Ramseur, Granite Falls, Hickory, Seagrove, Valdese, Taylorsville, Catawba, Troy, Biscoe, Candor, Hildebran, Mt. Gilead, West End

Madison, Dawson, Canby, Porter, Ivanhoe, Sleaton, Clarkfield, Sleaton L. Area, Lake Wilson, Edgerton, Lyle, Jasper, Avoca, Currie, Trimont, Lewisville, Truman, Welcome, Fairmont, Ellsworth, Lakefield, Sherburn, Lydia, Jordan, Bells Plains, Green Isle, Arlington, Henderson, Le Center, Elysian, Orchard Lake, Rosemount, Farmington, Lakeville, Montgomery, Waterville, Janesville, Onalaska, West Salem, Barre Mills, La Crosse, Viola, Readstown

KENNETH A. YOUNG
Iowa Division Manager
Central Telephone Company

IOWA

Little Rock, Larchwood, George, Ashton, Inwood, Orange City, Struble, Le Mars, Kingsley, Remsville, Washta, Pierson, Hamaha, Holstein, Sac City, Fort Dodge, Early, Otho, Lakeview, Thornton, Meservey, Swaledale, Goodell, Sheffield, Belmond, Alexander, Rowan, Latimer, Coulter

Des Plaines, Serenno, Park Ridge, Mount Carroll, Thomson, Lacon, North Pekin, Pekin, South Pekin, Manito, Green Valley, Havana, Forest City

MARTIN WANDREY
Illinois Division Manager
Middle States Telephone
Company of Illinois

ILLINOIS

De Funiak Springs, Crestview, Ponce de Leon, Valparaiso, Freeport, Fort Walton, Shalimar, Destin, Tallahassee, Monticello, Madison, Greenville, Crawfordville, St. Marks, Sopchoppy, Panacea

FLORIDA

ERNEST MENENDEZ
Florida Division Manager
Southeastern Telephone
Company

area alone currently needs 60,000 new telephones.

Three private companies perform the major part of Peru's telephone service.

The Compania Peruana de Telefonos Limitada (Peruvian Telephone Co. Ltd.) operates the telephone system of Greater Lima which includes Lima, Calleo, and the suburbs.

The Compania Nacional de Telefonos (National Telephone Co.) owns the long distance telephone and radio-telephone installations in Peru, including Lima, and also operates local service in cities in northern and central Peru.

Last year, the company installed automatic exchanges in various regions including Chimbote and Trujillo.

Automatic exchanges are currently being installed in Ica and Chiclayo. Ica was expected to be in operation in July 1959 and Chiclayo is scheduled for completion in December.

Plans for 1959 also include new carrier systems linking Lima with Oroya, Cerro de Pasco and Huanuco.

Sociedad Telefonica del Peru (Peruvian Telephone Society) serves the southern cities of Cuzco, Arequipa, Moquequa and Tacna.

The company installed 1,262 new stations in 1958, of which 344 were extensions, raising their total number of stations from 7,663 in 1957 to 8,925 in 1958.

The company plans to extend its facilities as far south as Arica, Chile, by linking its lines with those of neighboring Bolivian companies.

The International Petroleum Co. operates its own telephone system which is used to join the Talara, Lobitos and El Alto oilfields in northern Peru. In 1958 the company served 981 telephones, of which 244 were extensions.

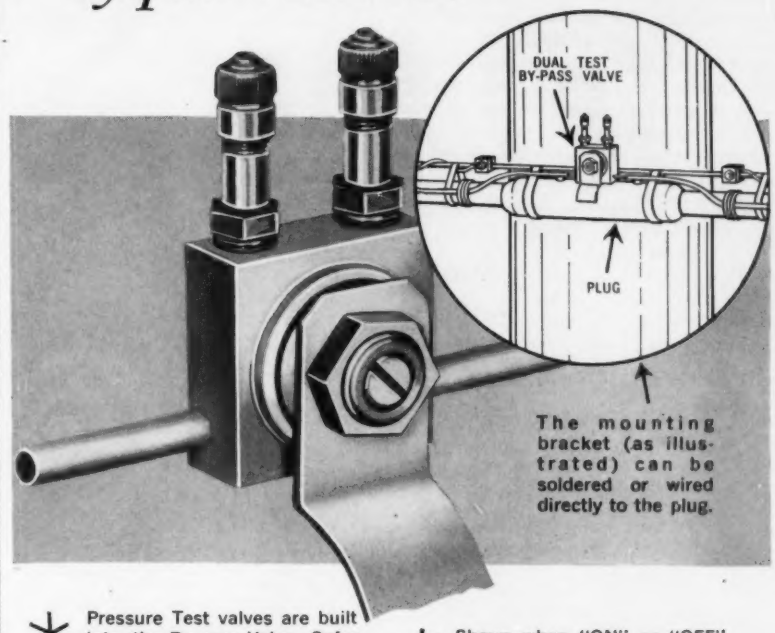
The Peruvian government also controls 600 lines connecting small towns with cities in which the government has telegraph offices.

"YOU DISTINCTLY SAID, 'BRING ME A SET OF BLOCKS!'"

Something NEW in By-pass Valves ... the

DAHL

Dual test by-pass VALVE!



- Pressure Test valves are built into the By-pass Valve. Safer and more efficient than reaching or moving ladder to make pressure tests.
- Eliminates separate Test valves and Tees on both sides of the plug.
- No need for disassembly during installation — metal diaphragm is not affected by heat from soldering connections.
- Shows when "ON" or "OFF" from the ground — control screw is visible when "ON", flush when "OFF"
- Attaches directly to the plug for ease of installation. Packless design for trouble-free operation.

This valve is ideal for all cable bypass installations. Pressures on both sides of the plug can be tested at the valve rather than at widely separated tees where the bypass tubing enters the cable. All parts are tin-plated brass in accordance with standard practice for outdoor installation.

Write for Bulletin T-1 for complete details on the Dual Test By-pass Valve and other Dahl units for indicating and regulating air in continuous flow systems.

See our exhibit at U.S.I.T.A. Convention, Room 641-A, Conrad Hilton Hotel, Chicago

News on New Products

PULLING WIRE IN SMALL SIZE CONDUIT—A new method of laying a line in small size conduit has been developed by the Jet Line Gun Co. Called the Jet Line Cylinder, it is designed to save time by eliminating the need for snaking wires through conduit with metal tape in ½-inch and ¾-inch conduit.

According to the company announcement, the Jet Line cylinder utilizes expansion of a harmless gas to propel a lightweight line package through conduit. Laying a strong nylon line behind it, this package travels the entire length of conduit in a split second, regardless of distance, bends, or obstructions. The nylon line is used to pull polyethylene rope, then wire, through the pipe.

James C. Hamrick, president of the Jet Line Gun Co., stated that the Jet Line cylinder, thoroughly job-tested in field trials, will operate under adverse conditions, such as the presence of water or stones in conduit as well as in conduit with tight or kinked bends. The line package actually jumps boxes in short runs, when conduit openings are in line. Mr. Hamrick added that the cylinder performs well in both long and short runs, and can be used quickly and easily by any person without special training.

Jet Line now offers the combination of its new cylinder for ½-inch and ¾-inch conduit wire pulling, and its Jet Line Gun for laying line in 1-inch conduit or larger. Request NP1190.

•

EARTH PROBE—A new device for accurately determining soil conditions is now being offered by the A. B.

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP1190_____; NP1191_____; NP1192_____; NP1193_____;

NP1194_____; NP1195_____; NP1196_____.

Name..... Title.....

Company.....

Street.....

Town and State.....

9/26/59

NEW MIF CABLE SUSPENSION CLAMPS...

Unmatched Performance-wise

Performance-wise, these clamps are unmatched. Once the clamp is installed and the clamping nut or nuts tightened, the messenger will remain tightly clamped regardless of any pole shrinkage. Large area pads resist sinking into soft poles—teeth on pads resist vertical movement. To facilitate messenger stringing, a "stringing finger" is incorporated in all clamp designs. Groove ends are belled to permit use for both tangent and angle supports. Each size has extra groove for ground wire if required. Specifications and price data in our new telephone industry catalog. Send for your copy today.

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BRANFORD, CONNECTICUT

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FOR OVER 100 YEARS

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UNITED UTILITIES SYSTEM
Map showing general areas of operations of United Utilities subsidiaries. Symbols represent number and approximate location, only, of communities served.
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Electric, Gas or Water
L P Gas
Corporate Headquarters
Operating Headquarters

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- CHLOROTHENE—does not corrode aluminum or aluminum alloys under ordinary conditions.
- VIREX—for use on telephones—aids in reducing the hazard of infection by airborne bacteria and viruses; used as a spray, makes air more pleasant and destroys disagreeable odors.
- TELEPHONE BOOTH GLASS CLEANER—easily dissolves smudge, film, scum, smear, bugs, and all soil; a new, easy push-button way to clean and polish.
- MARVEL TELEPHONE CLEANER—saturate clean cotton cloth and rub over instruments; one application takes off all stains.
- MAGNA MIST BOMBS—makes indoor air pleasant; aids in reducing hazard of infection by airborne bacteria and viruses.
- MAG-AL 3 ALUMINUM TELEPHONE BOOTH CLEANER—ideal for cleaning and shining your telephone booths both inside and out. Made especially for the telephone industry.

MAGNOLIA CHEMICAL CO., INC.
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427 WEST RANDOLPH STREET
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Chance Co. The Earth Probe is used to find the correct classification of the soil before an anchor is installed.

The probe is a 5-foot rod with a screw-type head. (Extension rods come with the tool.) It is screwed into the

ground to the depth the anchor will be installed with a special wrench equipped with a torque scale.

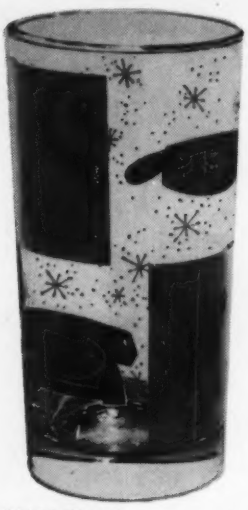
Torque readings are translated into soil classifications through the use of a conversion table which is fitted into the flap of the probe's carrying bag. Request NP1191.

•

NEW MODEL TRENCHER—A new 12-horsepower model, the M-322 Ditch Witch, is reported by the Charles Machine Works Inc. to be able to cut trenches to 5-foot depths and 12-inch widths. The M-322 is said to be a completely new trencher scaled up from the model M-3 to handle wider and deeper trenches and tougher digging conditions.

This new model can be used for underground telephone cable installations, foundation footings, sewer laterals, drain fields (double-cut trench), water lines to 5-foot cover, gas services

TELEPHONE TUMBLERS



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Designed Especially for Switchboard Operators

Made of Soft Pliable Vinyl Foam

- Easy on Ear
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Thanks for your splendid response. All orders being shipped promptly.

TELE-MUFF CO.
Box 832
San Fernando, Calif.

and main extensions, oil-field gathering systems, salt water lines, etc.

It is described as being powered by a Wisconsin AGN 12-horsepower air-cooled engine and is equipped to dig ditches 5 feet deep, 4 inches wide; 4 feet deep, 6 inches wide; 3½ feet deep, 8 inches wide; 3 feet deep, 10 and 12 inches wide, in any soil. Request NP-1192.

•

RACEWAY FOR CALL DIRECTOR TELEPHONE CABLE—The Wiremold Co. has developed a raceway designed specifically to provide necessary mechanical protection, within the lowest possible configuration, for carrying the cable used in the Bell Companies' new Call Director telephone.

Wiremold is also producing a terminal fitting capable of holding up to five Amphenol connectors. Two keyhole slots in the base make it possible to mount the fitting on wall, floor or desk. It is made of diecast aluminum, with a dull satin finish.

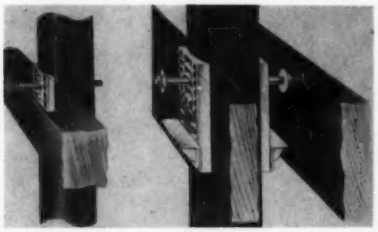
A reducing bushing, supplied for installations where a 75-pair cable is used, also serves as a strain relief clamp.

The raceway—known as Pancake 2800—is built to take either the 100-pair or 75-pair cable, yet the total height above the floor is held to one inch.

The cover, of .050-inch steel, and the base, of .040-inch steel, are galvanized. Piercings for fastening the base to the floor are staggered and so located that they cannot abrade the cable. The cover, which is secured to the base by No. 8 metal screws, is formed to provide a smoothly tapered contour measuring 3¼ inches across. Request NP1193.

•

LOAD TRANSFER PIECES—Several new load transfer pieces that make the economy features of the MIF grid gain assembly methods available for dimension timber framing have been announced by the Pole Hardware Division, Malleable Iron Fittings Co.



The new adjustable crossarm gains for use on single or double dimension arm "H" frame structures are described as versatile. An easily adjustable shelf will accept crossarms from 7 inches to

CONDEX MULTIPLE CONCRETE CONDUIT

SPOTTING OF CONDUIT ALONG RIGHT-OF-WAY ADJACENT TO PROPOSED TRENCH

NOW AVAILABLE IN ALL THESE SIZES: 2, 4, 6, 8 and 9 DUCT

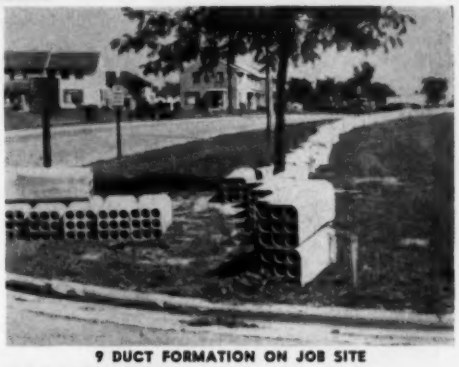
Special fittings—miters—short lengths—expanded web sections available, also adapters to claytile, transite and fiber duct.

CONVENIENT

Delivery can be made to jobsite on 24 hours notice. Condex may be installed in any weather, even in trenches holding water. Ditches can be covered as soon as installation is made. Due to low breakage factor, jobs can be estimated more accurately.

STRONG

Pittsburgh Testing Laboratory tests show: compressing strengths of 10,000 lbs. PSI; water absorption of 3.9%; load test-failure at 74,000 lbs. From a telephone company report on Condex multiple-duct concrete conduit—"it is obvious that no trouble was experienced in cable placing operations, no evidence of excessive abrasion on the lead sheath." Smooth bore is obtained by mechanical honing.



9 DUCT FORMATION ON JOB SITE

ECONOMICAL

Multiple-Duct Concrete Conduit is manufactured with a bell-end joint, eliminating the use of plastic or mortar bandages with dowel pins, for joining. A joint sealing compound, applied with a pressure gun, is all that is needed and cost of this joining operation is less than 3½c per trench foot for both material and labor.

Single crews have installed 1,600 to 1,800 trench feet of conduit per 8 hour day, with two to three less men than with other types which require mortar bandage joints.

Breakage factor of concrete conduit is less than 1%, due to strength of product.

FOR FULL INFORMATION—CALL OR WRITE YOUR LOCAL LICENSEE, OR THE PARENT COMPANY

CONCRETE CONDUIT CORP.
130-01 Northern Boulevard
Corona, New York
Illinois 7-1515

CHICAGO PRE-CAST PRODUCTS CORP.
9400 West Belmont Avenue
Franklin Park, Illinois
Gladstone 5-8116

UTAH CONCRETE PIPE CO.
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Export 2-7513

ELMORE CONCRETE PRODUCTS CO.
Div. of North Star Concrete Co.
Elmore, Minnesota
Elmore 52

EMPIRE CONDEX, INC.
6700 Mad River Road
Dayton, Ohio
Tuxedo 5-7051

WESTERN CONCRETE PIPE CO.
3501 Power Inn Road
Sacramento 19, California
Hunter 6-0026

T. E. L. PRE-CAST PRODUCTS CORP.
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Edgewater, Fla.
Garden 8-9881

J. E. EVANS CONCRETE PRODUCTS CO., INC.
Shelbyville, Indiana
Express 8-9734

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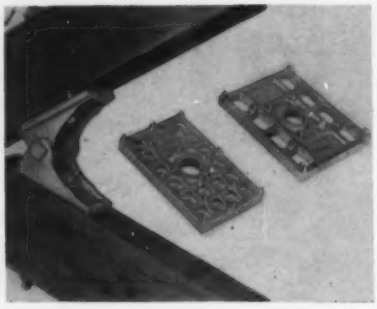
12 inches high. Both wood contacting surfaces have integral teeth which grip the pole or dimension crossarm, take most of the load off the wood surrounding the through-bolt hole, increase the transverse stability of the dimension arm, and provide more efficient load transfer. No cut gain on the pole is necessary.



For butt connections in dimension timber, the company offers its new MIF flat universal angle connector. The flat grid gain contacting surface provides maximum stability and facilitates framing. This connection is said to be easy to install, requiring only a single bolt attachment for each member.

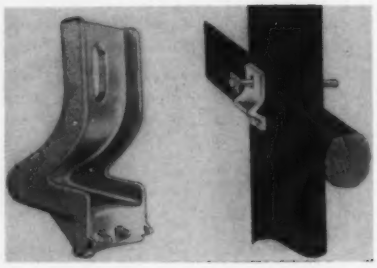
New flat grid gains (shear plates) are designed similarly to regular field-proved grid gains except that they are for use with dimension timber. Teeth and spurs, according to Malleable help to distribute the load rather than to concentrate it on the wood surrounding the through bolt, thus improving the performance of the connection. The large contract area increases stability and reduces the likelihood of pole and crossarm fires due to leakage current concentrations.

Also in this new series are MIF crossarm gains for attaching dimension arms to round poles on single pole and "H" frame structures. Advantages, the company notes, for these items are: Elimination of the need for a cut gain in the pole, and of the wood-to-wood contact which is a source of decay; maximum vertical and transverse stability achieved by efficient spacing of teeth and ribs over the contact area; easy adjustment for alignment; and reduction of leakage current concentration. Request NP1194.

•

CROSSARM GAIN—A new crossarm gain which the company says is designed to offer lower installation and maintenance costs when used with round distribution arms on single pole construction is also announced by Malleable Iron Fittings Co., Pole Hardware Division.

The advantages claimed are similar



to those experienced in the field with the larger MIF spar arm gains. The pole arm contacts the face and shelf surfaces of the gain and the lower portion of the gain is said to offer wedge action against overturn and vertical movement.

The large area of contact of the pole arm on the gain is described as adding transverse stability without requiring a cut gain in the pole. The thru-bolt is in tension, in which it is strongest—not shear.

There is no wood-to-wood contact, lessening the probability of decay.

The company says the through bolt always passes through the diametric center of the pole arm, eliminating costly field drilling, and requiring only one attachment bolt.

Further savings are made in inventory and handling costs, according to

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance — Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resiliant, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

Malleable, because the single size will accept the range of pole diameters. Request NP1195.

•

TREATED FLOOR CLOTH—Chicopee Mills, Inc. says that added safety and sanitation are possible with their latest treated semi-disposable Masslinn Cleaning Cloth. This relatively new product, which is used for dry-dusting floors when attached to the Masslinn Sweeping Tool, now contains a fire retardant and a germicide.

The company says when the cloth is used with a Masslinn Sweeping Tool, complete floor or wall areas can be cleaned without dust, and without oiling, dampening or chemical sprays.

The lightweight sweeping tool holds an over-sized disposable cloth in such a way that the entire surface of the large cloth is used for long periods of cleaning before disposal.

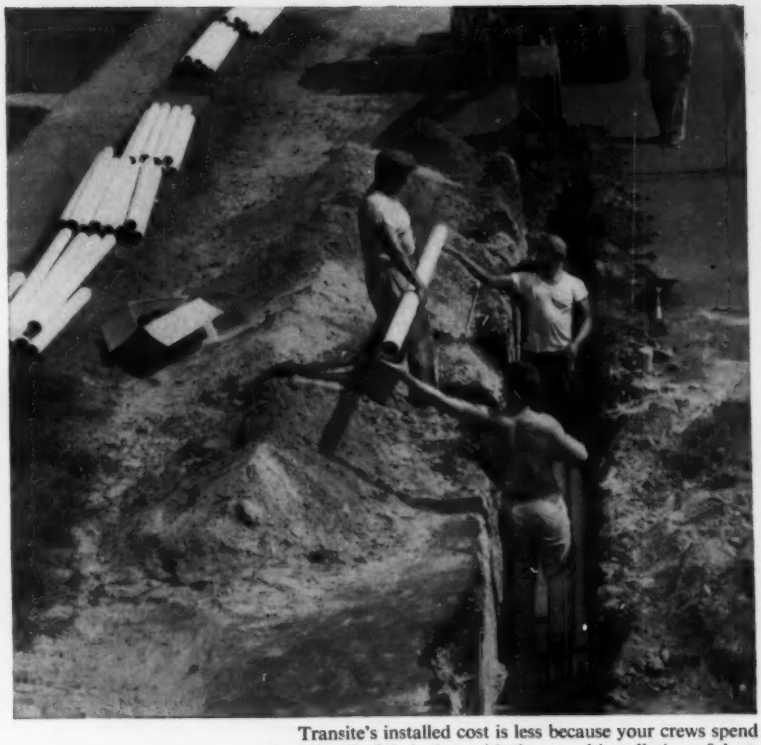
This textile, called a "non-woven fabric," opens a new concept of cleaning for maintaining dust-free areas, the company says. It is described as inexpensive enough to discard after long use, and the low-cost production methods make it possible to add desirable ingredients which are fresh and uniform with each change.

The Masslinn cloth is a flannel-like non-woven fabric, which Chicopee Mills says, absorbs and retains the dust and dirt. Said to be uniformly impregnated with a special emulsion for maximum pick-up, the cloth does not leave any deposits on the floor or edges of rugs. It is also reported to impart a clean, lustrous finish to floors without slip hazard.

In addition, Masslinn disposable cloths are proving useful as furniture polishing and dusting cloths, the company says. Request NP1196.

Soft Living

"We see the pernicious effects of luxury in the ancient Romans, who immediately found themselves poor as soon as this vice got footing among them."—ADDISON.



Transite's installed cost is less because your crews spend virtually all of their time with the actual installation of duct.

Now—save 5¢...10¢... up to 15¢ per duct foot!

Here's why Transite Telephone Ducts offer these substantial savings in installed cost!

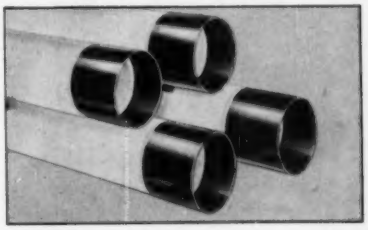
In virtually every part of the nation installations of Transite® Telephone Ducts are at a new high!

Why? For the simple reason that no other material offers so many practical advantages . . . with each contributing to lower *installed* costs. In fact, savings can run as high as 15¢ per duct foot!

With Transite you're working faster, easier . . . with smaller crews. For there's no complex joining and difficult positioning. Instead, the 10' Transite lengths are easily handled by one man. And the plastic coupling used with Transite makes a tight joint that goes together in seconds . . . stays tight for the life of the line.

More time and labor are saved in splaying...curving...bypassing...and in manhole connections! Every one of these on-the-job requirements is met with a minimum of "extra" in time and material.

With Transite you have fewer items to stock, less warehousing, lower inventory costs. There's less handling of material all around. As for breakage, there's practically none. Savings are substantial.



Write today for brochure TR-239A, "Transite Telephone Ducts." It gives complete information on why Transite's installed cost is lower . . . as well as why it reduces future costs in cleaning, rodding and repair. Address Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ont.

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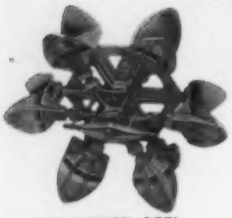

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Special Purpose Tools To Specifications — Catalog on Request

Over 600 various items of Line Construction Tools, Maintenance & Pressure-Testing Equipment in stock for immediate shipment

Nothing Beats It For Fast, Low Cost Digging

Here's a front and rear view of the more powerful, compact 4T Vermeer Pow - R - Ditcher in action. If you are looking for a low cost, rugged, time - saving ditcher, take a look at the 4T before you buy.

Vermeer Model 4T POW-R-DITCHER

This rugged, self - propelled Pow - R - Ditcher is only 48" wide, 6' high and 13' long and can be transported in a pickup truck. A "midget" ditcher that is ideal for laying gas, water and narrow service lines. The 4T is highly maneuverable — digs 6" to 14" wide and down to 4½' deep.

WRITE FOR COMPLETE INFORMATION, LITERATURE AND LOW PRICES ON THE COMPLETE POW-R-DITCHER LINE.

VERMEER MANUFACTURING CO.

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INFORMATION—THE POSER

Concluded from page 78

called for much research. This tied up local trunks and equipment, expensive toll circuits and the distant Information operator's time, along with the toll operators' time at both ends of the connection. To assist in hurrying such calls to completion, it was decided to experiment. The newspaper PBX was supplied a library of telephone directories for the cities most frequently called.

A surprising thing happened. The plan was a success from the start. Calls for information dropped to practically zero. Other tenants in the large office building housing the newspaper, visited the library and looked up the telephone numbers of clients in distant cities. As news of the directory library became noised about, neighborhood business folks began to drop in for informational data. Today, the newspaper is proud of its directory library and often comments on the faster service they now receive on emergency calls.

We read today that the first electronic switching equipment is being installed at Morris, Ill., and will be in operation late in 1960. The job this "central control" equipment will do is almost beyond belief. Perhaps some day electronics will make it a little more easy for the telephone companies and their sorely pressed Information operators. But, until some computing or electronic brain makes a snap out of Information service, we must struggle along as best we can. We must seek help from every available source and we can do this only if everyone of us sincerely and earnestly uses his talents toward making our Information department the smooth, efficient operating machine it can become.

Aids Crash Victims, PT&T Man Gets Vail Medal

Glenn T. Fancy, a wire chief, became the Pacific Telephone & Telegraph Co.'s 125th recipient of the Theodore N. Vail medal for heroism on Aug. 26.

In May 1958, Mr. Fancy quickly administered first aid to a man and the victim's two children injured in a three-car collision involving 15 persons.

Physicians credited Fancy with saving the lives of the man and his children as well as helping others hurt in the accident.

The Vail medal has been given over the past 39 years to Bell System employes whose quick actions have saved lives.

VOLUME FIFTY THE TIMES-STAR, CENT

Telephone Man Strikes Gold

Never dreamed it was there!

. . . TOWN, AUG. 14. This community was electrified today by the discovery of gold in a sparsely settled area north of town. Mr. Johnson, manager of the local telephone company, and his crew of linemen were digging a trench to bury telephone cable when the rich strike was uncovered. Mr. Johnson's emotions were mixed.

"Just last month I was approached by a man who offered what seemed like a good price for this 'worthless' property. I sold it to him."

It's too early yet to size up the true value of this discovery, but estimates seem to indicate

Final Concert at Ce
Marks Close of

This event, imaginative in detail, is completely true in fact. Independents are today the owners of undiscovered gold mines. The accompanying story is just one of many such examples. Nowhere is the gold lying on the surface—or it would have been picked up long ago. And once discovered, it must then be mined: potential customers must be sold on the advantages of a region.

As in any other business venture today, present profits must be weighed against the larger rewards of the future. For the small Independent who can shape up to the requirements of the present and hold on to his property, time works in his favor. It was for this very purpose that the Stromberg-Carlson Credit Corporation—first of its kind and still unique in the breadth of its services—came into being. Independents numbered in the hundreds have been assisted when no other type of financing was feasible; most of them are now in a strong position, with an assured future. There's a heap of gold yet to be dug!

"Still trying to catch my breath . . ."

"Expansion is easy, maintenance a bare minimum." Ralston Robertson of Bayou La Batre, Ala., has three XY® Dial exchanges and a growth that leaves him breathless.

"Five years ago we stood on this very spot. Here in front of us the open Gulf, stretching south over the horizon to Yucatan . . . nothing can change that. Over there to the east these same dunes and pine trees blocked off old Ft. Gaines and the few old fishermen's homes you saw facing the Inland Waterway. The rest was just sand—10 miles of it—and, when the tide washed away your footprints and the bow-mark of your boat, there was nothing to show that anyone had ever come ashore. And we were talking about where to put a telephone exchange!"

Ralston Robertson paused, trying again to catch the breath that has been eluding him ever since he bought the telephone properties at Bayou La Batre back in '46. Not much of a property, to be sure, with its 88 phones ("Speak up, please; I can hardly hear you") and the questionable franchise to serve other communities that had never known telephones. But it took all the savings he had managed to accumulate during four years of military service, and one fact alone took this venture out of the realm of pure gamble: the situation could hardly get worse! Included in the original purchase—probably because no one wanted it—was the offshore sandbar that has recently rocketed to front-page copy: Dauphin Island.

You might almost say that United States history began here. The island and certain other sections of Mobile Bay were charted on the Waldseemuller Map of 1505. In 1559 a settlement was made on the island by Tristan da Luna, sent out by the viceroy of Mexico to colonize the uninhabited lands to the north. Two years later a severe hurricane washed out the settlement; the survivors returned to Mexico and a few years later these same men established St. Augustine, Florida, with more permanent success, since this town rates the title of oldest in the U.S.A.

Dauphin Island received its present name when under the French flag, as provincial capital of a Crown appointee responsible to the Dauphin (heir apparent). When the residence was moved to Mobile, the island lost importance until its strategic location athwart the entrance to Mobile Bay gave it military significance during three wars. Since 1920 it has slept peacefully . . . that is, until Mobile businessmen and a neighboring telephone manager planned and built the 5-mile causeway to the mainland and thus started writing the most exciting chapter of this story.

As we stood with Mr. Robertson on the deck of the property owners' beach club (a spectacular building that won national honors for the architects), we could see the Sunday crowd gathering up beach blankets, picnic and fishing gear from the public reservation. Just beyond was the beautiful new Holiday Inn, which provides colored telephones and many other extras in each of its 100 guest

Dauphin Island, 1959, didn't just happen. It was a planned investment yielding better than 100% dividends.

Advertisement

rooms. Then, stretching over the sand to the point where water and sky merged imperceptibly, one beach home after another and another.

"Every week I have to count them," said Mr. Robertson. "These builders are just too busy to let me know when they start another."

"But they don't seem to be using telephones," I said, noting that the only telephone poles on the island were used for columns to raise the cottages well out of reach of any possible hurricane damage.

"Long before there was a house out there, I had buried several miles of cable wherever streets were to be laid out. No problem with today's plastic, and you can dig a trench in sand much easier than setting poles."

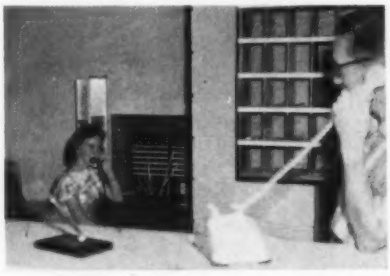
My wife and I were both struck with this strange reversal of custom, where wires were buried waiting for their eventual users, while graves in the old cemetery—most bearing French names and with dates indicating a short life span—were mounds above the ground level.

Dauphin Island today is *one* story, and not unknown. Many who had set compass for more established resorts have tried this place and found no reason to travel farther. Whether it's the azalea season in nearby Bellingrath Gardens, the Deep Sea Fishing Rodeo or the clean, uncrowded beaches in summer, or the extension of vacations into the quieter fall months, people who come are conquered.

Equally interesting, and less known, is the story of the Bayou Telephone Company, for this type of success has been and will be repeated elsewhere. No one guaranteed that this investment in 88 stations would prosper or even be recoverable. No lending agency would have provided necessary monies to do the rebuilding and expansion if the manager had not demonstrated both his own initiative and ability. But when this had been demonstrated, the Stromberg-Carlson Credit Corporation put its resources on the line with Ralston Robertson's faith. The 88 customers had grown to 1575 in July—but that was two months ago! Percentagewise this may well be some kind of a record. This much is certain —you aren't given much time to sit down and catch your breath.

Much of the Stromberg-Carlson loan went for outside plant, such as miles of buried cable ready to serve future subscribers. Substantial summer homes are mushrooming.

People may come and go as the ever-changing tides: the shrimp boats are forever. Seafood is principal industry of Bayou La Batre where this Jack-in-the-Beanstalk story began.



100 rooms, 100 phones in color to match attractive decor. Stromberg-Carlson 120 Switchboard handles house traffic and sizeable toll efficiently.

Dauphin Island has a proud history predating the settlement at St. Augustine.

Newly completed Inn now places Dauphin Island in forefront of tourist vacation spots for year-round holiday fun.

Advertisement

YOUR USITA TODAY

Continued from page 36

It would be impossible to discharge the various responsibilities of the Washington office of the association without a competent, efficient secretarial staff. The USITA has such a staff composed of Misses Georgianne Adams, Barbara D. Hyde, Mary Jane Rawson and Edna L. Switzer, and Mrs. Helen Abrams, Mary E. Dellinger, Lois Jolley and Mary Lee.

Objectives of USITA

The present-day objectives of the USITA and the services available to its member companies may be summarized briefly as follows:

(1) *Toll Compensation.* Through its full-time toll engineer and designated committees, the association makes studies of toll compensation problems. It negotiates with the Bell System for increased compensation for Independent companies on interchanged business. (Since 1936, toll compensation for the Independents has grown from 12 million dollars to 190 million dollars, a considerable portion of the increase being attributed to the association's efforts.)

(2) *Legislation.* USITA serves as a first line of defense and as official spokesman on the legislative front. It studies proposed laws affecting the telephone industry, and makes appearances before congressional committees. The Washington office is constantly alert to protect the interests of all Independent telephone companies.

(3) *Government Regulations.* The association's Washington office also maintains liaison with important government offices and military agencies whose activities directly affect the well being of Independent companies. The USITA promotes understanding between Independent telephone companies and these groups. It makes formal appearances before them when necessary.

(4) *Member Letters.* The association's Washington office issues member letters giving current information and advice on legislation, court decisions, government orders, advertising, merchandising, public relations, and other developments affecting the industry.

(5) *National Convention.* A great force in life today is the feeling of "belonging." Each year this feeling is further cemented at the association's convention where manufacturers' exhibits of the latest equipment are displayed and speakers of national prominence are heard.

(6) *Industry Relations.* The association cooperates closely with 39 state telephone associations. It maintains

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MEMORANDUM

TO: Company Managers

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RELAY SPRING COMBINATIONS
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for use with
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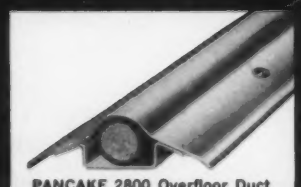

PANCAKE 2800 Overfloor Duct

new!

TERMINAL FITTING —HOUSING FOR FIVE CONNECTORS

Used with the Bell System Call Director Telephone, Wiremold's 2857T Terminal Fitting effectively provides an ideal housing for cable connectors. Of rugged diecast aluminum, it can be mounted on floors, walls, desks (side or kneehole).

For away-from-wall locations, Pancake 2800 Overfloor Duct is the neat way to house and protect the cable. Fitting and duct both hold 100- or 75-pair cable.

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close liaison with manufacturers, suppliers, directory publishers, the industry press, accounting and engineering consultants, and other firms, as well as with the Canadian Telephone Association.

(7) *Statistics.* The association gathers statistics covering the results of operations of Independent companies and publishes annually statistical volumes of great help to these companies as an aid in testing the efficiency of their operations.

(8) *Prestige.* Each company receives the added stature which comes from membership in a national trade organization representing a united industry. Each company profits materially from participating in a comprehensive program.

(9) *Reservoir of Information.* The association is a source of exhaustive information relating to almost every aspect of telephone operation.

(10) *Breadth of Activity.* The association has the distinct advantage of having its headquarters in the nation's capital. It has a competent full-time staff. In addition, it has 21 committees, with carefully defined duties. These include accounting, advertising, commercial, employment relations, engineering, highway relocation costs, liaison with private communications systems, military liaison, national defense, plant, problems of small companies, personnel, taxes, telephone marketing, toll compensation, traffic, and REA borrowers. The advice of these well qualified committee members, each a specialist, as well as of 14 regional small company committees, is available to all association members.

Past Accomplishments

The past record of the USITA speaks for itself. To refresh your memory, some of the more important association activities over the years and the goals achieved are cited:

(1) Exemption of switchboard operators from wage-hour provisions of the Fair Labor Standards Act—500 station exchanges in 1939; 750 station exchanges in 1949.

(2) Exemption (partial) from jurisdiction of the Federal Communications Commission in Section 2 (b) (2) of the Communications Act when this statute was enacted in 1934.

(3) Legislation amending the Communications Act to preserve Independent company exemption from FCC jurisdiction when radio is used in telephone operations. (1954.)

(4) Increase in toll compensation on business interchanged with Bell System companies. In 1935 the Independents' share of revenues from interchanged traffic was less than 12 million

"These two Paystations average $148.14 per Month"

REPORTS H. H. RANDALL, GENERAL COMMERCIAL MANAGER, GENERAL TELEPHONE COMPANY OF MICHIGAN, MUSKEGON, MICHIGAN

Busy intersections and paystations go together like ham 'n eggs. In downtown Muskegon, Michigan, increased pedestrian and auto traffic had created several busy intersections. The telephone company did some surveying and decided that these intersections had high revenue potential. Paystations were set up—and they proved profitable. For example: the two paystations above average $148.14 per month.

Let us help you make paystations pay off in your town. Write for a *free* copy of our pocket-size Survey Simplifier. It helps you find paying locations for paystations. Write Automatic Electric Sales Corporation, Northlake, Illinois. Or call Fillmore 5-7111. In Canada, Automatic Electric Sales (Canada) Ltd., Toronto 16.

H. H. Randall

PAYSTATION REVENUE FROM BOOTHS AT BUSY INTERSECTION, MUSKEGON, MICHIGAN

The two paystations at the above intersection totaled $1,777.75 for 12 months. One paystation brought in $919.55; the other, $858.20. Collections cover both local and toll revenue.

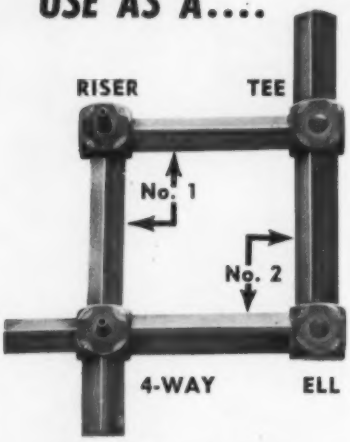
AUTOMATIC ELECTRIC

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

NEW, universal fitting* used with the two sizes of Flexiduct solves all over-the-floor wiring problems.

USE AS A....



- Under Floor Input
- Terminal Box
- Junction Box
- Or In Combinations of All

Fits any over-the-floor wire molding. This new fitting used with Flexiducts two sizes is the popular, easy solution on all jobs.

Flexiduct No. 1
will carry up to 8 conductors of inside wire. Chase ¼" x ½"

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will carry up to 25 pair cloth cable or 16 pair plastic. Chase ½" x ¾"

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dollars. By 1953, this share was increased to 116 million dollars. In 1959 it will be more than 190 million dollars. Part of this was attributable to the direct activities of the association through its toll compensation committee, and, of course, a part was due to traffic stimulation in the intervening years. To mention the work of the toll compensation committee in only two years: In 1953, the association successfully negotiated an 18 million dollar increase on an annual basis, and in 1956 an additional 11 million dollars.

(5) Amendments to Hill-Poage bill (amending REA Act) prohibiting the lending of money to municipalities to go into the telephone business by buying existing property or constructing new property in competition with private industry. Also, certain other amendments designed to protect private enterprise. (1949.)

(6) Reduction in excise taxes on telephone calls. These came about as a result of leadership of the USITA, principally its Tax Committee, and the efforts of the Bell System. At every hearing on tax legislation since the excise taxes were put on the statute books, the association has made appearances and presented testimony urging repeal.

(7) Amendment of federal tax laws allowing telephone companies a credit of 7 per cent before computing excess profit tax liability. The only other businesses which received this advantage were Western Union and air carriers. All other regulated business was permitted only 6½ per cent credit. The excess profit tax has now been repealed.

(8) Successful objection to the minting of fractional coins which if permitted would have interfered with coin box telephone usage. (1950.)

(9) Amendment of the D'Ewart Bill in order to remove objectionable language permitting federal public parks to provide telephone service in areas "adjacent" to such places. (1953.)

(10) Amendment of Defense Production Act in 1950 exempting rates of telephone companies and other utilities from federal wartime control in Washington. A similar though not identical exemption was won in the Emergency Price Control Act at the beginning of World War II.

(11) Successful resistance in 1950 to enacting of so-called anti-gambling bill, because of the form in which introduced. This bill would have placed the burden of proof on telephone companies to show that telephone conversations were not being made in furtherance of gambling activity. If enacted it would have been an entering wedge to a na-

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Tel-O-Bank desk set doubles in service as a paper weight while it holds up to $20.00 in small change. Beautifully molded in colors and materials to accurately match today's telephones. Receivers can be imprinted with names or initials. Special price to telephone company employees $1.75 each. Bank with matching ball point pen priced special at $2.25 each.

Write today for colors and other details.
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tion-wide system of communication censorship.

(12) Successful representation, in 1953, to Senate Banking and Currency Committee in opposition to provisions in a committee sponsored economic stand-by control bill which, if enacted, would have subjected telephone and other utility rates to federal control whenever national emergencies were declared.

(13) Reclassification by FCC of telephone companies under Uniform System of Accounts. (1952.)

(14) Adoption by the FCC of a number of amendments to its rules whereby reports required of telephone companies have been simplified or eliminated. (1953-1954.)

(15) A federal statute of limitations to govern the bringing of suits for wage arrearages under the Fair Labor Standards Act. The association drew the first bill on this matter, prepared a brief on it, galvanized 15 or 20 other trade associations into action, inspired a hearing before the House Judiciary Committee, and testified in support of needed legislation. It was enacted a year or two later, in 1949, as a part of revisions of the Wage-Hour Act.

(16) Development of a revised, simplified Continuing Property Record Plan accepted by the FCC for use by Independent telephone companies. (1947).

(17) Annual compilation of a statistical volume covering the results of the operations of Class A, B and C Independent companies during the preceding year.

(18) Association development and maintenance of policies pertaining to Bell-Independent property relationships which, while without binding legal effect, nevertheless stand in the nature of a red flag and deterrent to general Bell System acquisition of Independent property.

(19) Representation of the Independent industry in numerous proceedings before the FCC, and the Wage and Hour Division of the Department of Labor. Representation before other government departments, including the military on SAGE and other defense matters. Representation before congressional committees on various matters not specifically mentioned elsewhere.

(20) Highway reimbursement provisions in Federal Aid Highway Act of 1956.

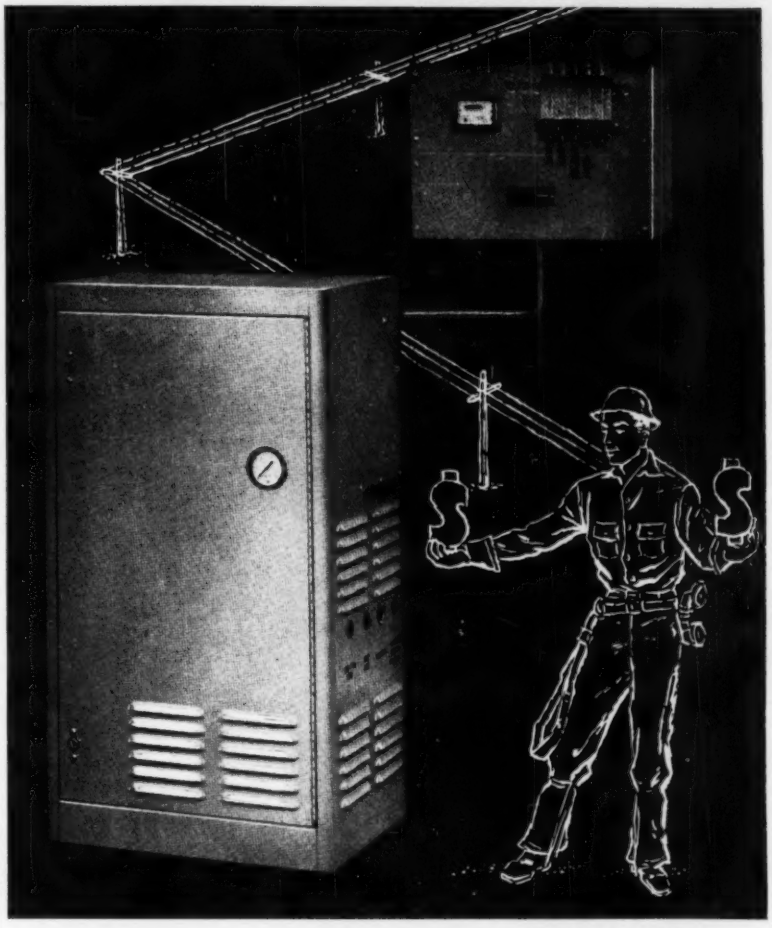
(21) Conduct of nationwide institutional advertising campaign, begun in 1954.

(22) Sponsorship of Engineering

(Please turn to page 142)

PUREGAS...

A DIRECT LINE TO LOWER MAINTENANCE COSTS



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Records show cable maintenance costs decrease materially when lines are pressurized with PUREGAS Dry Air. Sheath breaks can be detected as they occur, allowing, in most cases, the supervisor to schedule orderly repairs during the regular working day. PUREGAS equipment automatically maintains air pressure in the sheath to keep moisture, dirt, and corrosive fumes from reaching the conductors. Even during floods, PUREGAS Dry Air equipment established records in protecting cables against water damage.

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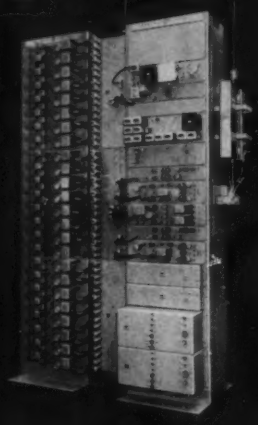

2 kmc
6 kmc
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frequency division
now available

By adding 6 KMC equipment to its 2 KMC line, General Electric now offers the first and only complete line of microwave in the industry.

Proved Reliability

General Electric microwave equipment has earned an outstanding reputation for dependability. Southern Colorado Power Company, for example, enjoyed a reliability factor of 99.99 percent in 18,360 hours of operation using General Electric 2 KMC equipment. This same reliability is engineered and built into the new 6 KMC product.

More Flexibility for Systems Designers

Microwave systems designers now have a wider choice than ever before *from one unbiased source.* They not only can choose between 2 and 6 KMC equipment, but also between time and frequency division multiplexing. Thus systems planners can pick the exact product or combination of products to suit their needs, providing from one to 120 voice channels for communication or control.

For complete information on General Electric microwave, contact your G-E communications consultant, listed under "Radio Communication Equipment" in the Yellow Pages. Or write General Electric Company, Communication Products Dept., 3599-26, Mountain View Road, Lynchburg, Va.

Progress Is Our Most Important Product

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Communication Products Dept.

GRAYBAR NOW FEATURES THE VERSATILE, RELIABLE G-E 6 KMC MICROWAVE

The new General Electric 6 KMC Microwave, now available from Graybar, enables you to plan systems providing as many as 120 channels for communication data or control.

High reliability for low maintenance is built into the G-E 6 KMC Microwave. Evidence is use of the Klystron tube, and use of a transistorized service channel.

Addition of G-E Microwave equipment to our extensive line of quality products again demonstrates that the telephone industry can fill all its communication needs from one convenient source... Graybar.

Phone your nearby Graybar man, now, for complete information.

Also: New G-E Transistorized Progress Line of mobile radios—now available from Graybar—the world's most advanced, smallest, commercial two-way mobile units. 942

See the new G-E 6 KMC MICROWAVE and PROGRESS LINE MOBILE RADIO
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New Irwin Adapter Shank Wood Bit

Now you can eliminate the need to stock two types of wood auger bits. Irwin's new Adapter Shank Bit fits both hand braces and power drills.

With hand braces, use the Adapter Shank Bit as it comes. Cut off taper square and the Adapter Shank, with its 6 "hex flats", chucks perfectly in power drills or hand braces, either one. No wobble, no run-out. Clean, efficient cutting action. Reduces inventory and record keeping by 50%. Saves time on the job, too. Call your distributor, or write today for complete information. Sizes 4/16" to 17/16", both solid center and single twist types.

All Irwin Adapter Shank Wood Bits are forged in one piece from special steel and heat tempered full length for longer life. Plastic coating on balanced cutting heads guarantees factory-fresh sharpness, unequalled performance. Widely used by utilities, electricians and construction workers.

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Seminar at Michigan State University and of Management Development program at the University of Kansas.

(23) Twenty-one regular committees and 14 regional committees which are valuable reservoirs of information and advice on many phases of telephone operation.

(24) Achievements of stature as a national trade organization and as the effective mouthpiece in the national arena of a dynamic industry.

The USITA has to its credit more than six decades of valuable service to the Independent telephone industry. Down through the years it has met the need of the industry as an official mouthpiece at the national level. Its accomplishments in the past have been many and outstanding. With the present growth of Independent telephony and its increased complexity, the association's future accomplishments and service to member companies are due to become even greater. USITA has proved, beyond every doubt, that in unity there is strength.

VISITING THE MANUFACTURERS' DISPLAYS

Concluded from page 41

comes? If not, why not, and what to do about it?

And, for the future, even while new transoceanic cables and transcontinental radio relays are being installed, the advanced guard of telephone science speaks confidently of bouncing signals off the moon or man-made satellites. So why don't you take another bite off that magic cake and wander up to what is really an Alice's Wonderland, the USITA convention display rooms—instead of sitting around with certain loafers (who shall be nameless), drinking up all the milk in the hotel and complaining: "Why doesn't somebody TELL me these things?"

Any telephone man or woman who does not thrill to the possibilities of these innovations would be exceptional, if not quite bright. Most of us "laymen" do not ever have a chance to go galloping off to technical conventions or international exhibitions. Most of us can only read what we see in the trade press, and its very enlightening advertisements. But, in addition, there is that one place where we *can* see, with our own eyes, what is cooking and what is new. That is at the Chicago convention displays. And we can touch it with our own fingers and ask questions; all sorts of questions, wise and foolish. And, they will be answered politely and authoritatively. And, we can go away with an armful of literature for further enlightenment if we so desire.

To overlook such an opportunity is to miss half the fun and a good portion of the advantages that could be ours from convention attendance. These exhibits were rigged up by experts. Resourceful geniuses, who know how to simulate long distance toll operation within the limitations of a 15-by-18 display room. But, bear in mind, the exhibits were not solely intended for experts. They were intended for you, and even me. They were intended to show all the telephone people, whatever their calling and background, the marvels of modern telephony. By all means go up there and take a good, long look and you will come back bemused and amazed as Alice after she had nibbled on the magic cake (and missed the White Rabbit).

* * *

P.S. Have to cut it a bit short this week on account of a message just received that a Mr. Nameless, a loafer, wants to see me right away about an important matter. See you all in Chicago, Oct. 11 to 14!

Bell Labs Opens Field Office in Cal.; Branch in O.

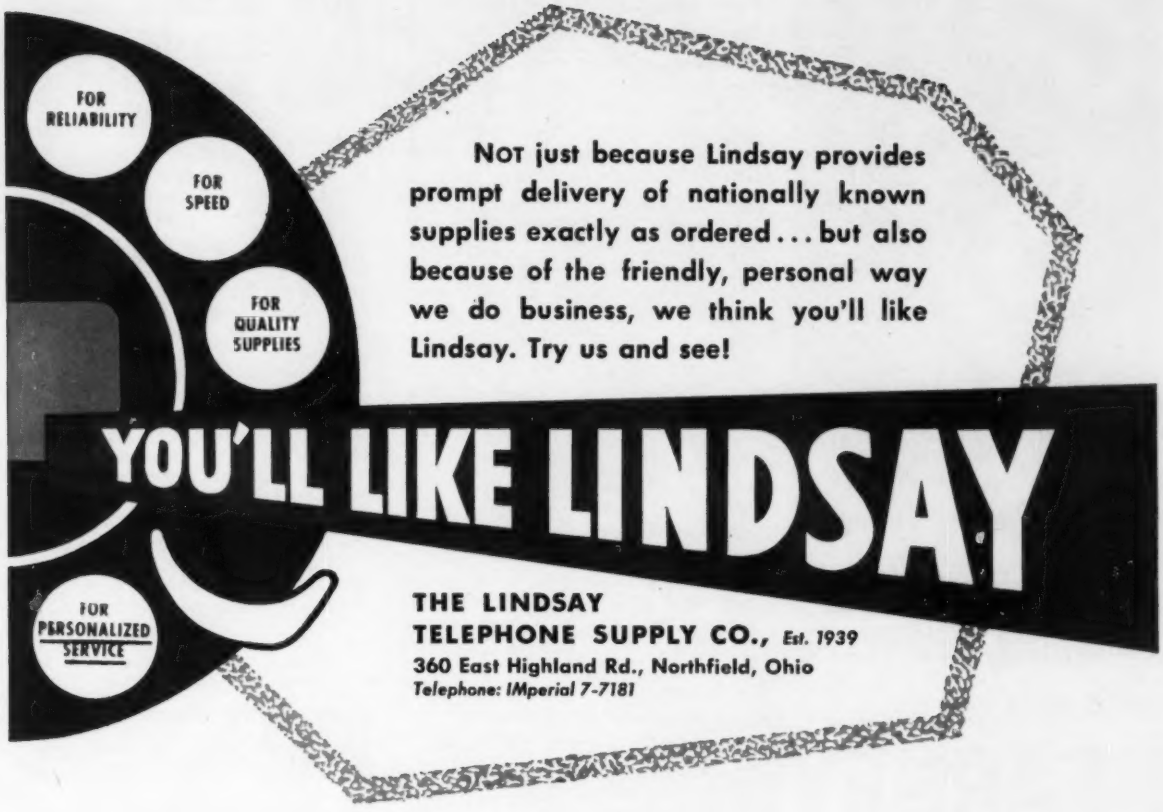
Bell Telephone Laboratories has opened a field office at Vandenberg Air Force Base near Lompoc, Cal., and a branch laboratory at Western Electric's new plant in Columbus, O.

The Bell Laboratories-Western Electric command guidance system for Titan, the new intercontinental ballistic missile, will be tested at Vandenberg.

The new branch laboratory at Columbus takes up part of three floors in Western's office building.

A No. 1 and No. 5 crossbar lab has been installed in the production building. Labs people will work on development programs and do liaison work with Western on No. 1 and No. 5 crossbar switching systems, electromechanical switching equipment, and engineering on related apparatus components.

In addition to Vandenberg and Columbus, Bell Labs also has locations in New York City; Murray Hill, Whippany, Holmdel and Chester, N. J.; at Western Electric plants in North Andover, Mass., Kearny, N. J., Allentown and Laureldale, Pa., Baltimore, Winston-Salem, Greensboro and Burlington, N. C., and Indianapolis; and at two military installations, Cape Canaveral, Fla., and White Sands, N. M.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FOR SPEED
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FOR PERSONALIZED SERVICE
NOT just because Lindsay provides prompt delivery of nationally known supplies exactly as ordered... but also because of the friendly, personal way we do business, we think you'll like Lindsay. Try us and see!
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SEE US AT THE USITA CONVENTION ★ OCTOBER 11, 12, 13, 14 ★ CONRAD HILTON HOTEL ★ DISPLAY ROOM NO. 617-A ★ HOSPITALITY ROOM NO. 1000 ★ EXHIBITS OF MANY NEW PRODUCTS ★ *THE LINDSAY TELEPHONE SUPPLY COMPANY, 360 EAST HIGHLAND ROAD, NORTHFIELD, OHIO*

Wire-Saving Snubbing Action . . . with this

KEARNEY

SNUB-R-GRIP DROP WIRE GRIP

On poles or buildings this free-swinging drop wire tie provides a "snubbing" action stronger than the rated strength of the wire. This is possible because the unique spiral grip distributes the pull over a long length of wire. KEARNEY Snub-R-Grips are quickly installed and easily salvaged. Just wrap the wire (twisted pair, parallel or synthetic-jacketed) into the grooved spiral. A portion of the groove's inner surface is specially coated to give maximum non-slip grip . . . without damage to insulation.

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Free Manual Offers Hints To Prospective Book Authors

"Anyone who can write a good business letter has all the literary ability he needs to write a good technical or professional book." This statement leads off a new 50-page manual, "Writing and Publishing Your Technical Book," just published by F. W. Dodge Corp. and offered free of charge.

The booklet is written to help authors organize and develop their book ideas to a point where they can obtain the support and backing of a publisher.

It answers a great many questions about the author-publisher relationship, and it also presents practical checklists for preparing material for publication.

The Dodge company says it believes that a great many potentially successful authors hesitate to contact publishers with a manuscript idea because they are unsure of one or more things: They may not know how to choose and approach a publisher. They may think the publisher does not want to see them before they have a completed manuscript. They may not know what the publisher will expect from them once they begin a writing project. They may have only a dim idea of how a publisher operates.

This new manual answers these and hundreds of other questions. Among its chapters are: Should You Write a Book?, Planning for Success, Choosing a Publisher, The Prospectus and Outline, Writing the Specimen Chapters, Acceptance and the Contract.

A great deal of little-known information about the workings of business and technical publishers is also included.

Another feature is a point-by-point discussion of the author's contract in which the responsibilities of all parties are fully outlined.

A free copy of "Writing And Publishing Your Technical Book" can be obtained from Dodge Books, F. W. Dodge Corp., 119 W. 40th Street, New York 18, N. Y.

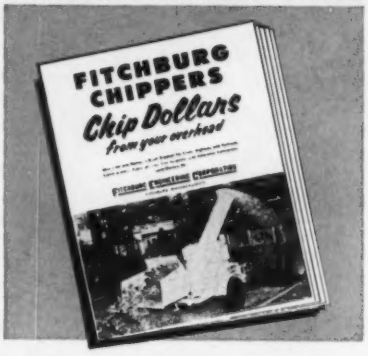
Turkey-to-Alaska High Frequency System Planned

A super high frequency network, which will be able to handle intercontinental defense messages from Turkey to Alaska will be a reality within three years, according to a report in *Electronics* magazine.

Yet to be completed in this network is "Ace-High," the North Atlantic Treaty Organization's 6,500-mile tropospheric scatter system which will reach from Turkey to England.

In troposcatter communications, radio

HOW TO SAVE MONEY IN BRUSH DISPOSAL



Read how foresters, tree surgeons, highway and park commissions, telephone, power and gas companies cut brush disposal costs up to 50% with a Fitchburg Chipper.

See cut-away color drawings of the Fitchburg Chipper—the exclusive Fitchburg spring-activated feed plate—pictures of different models in action.

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How to CONTROL and ALARM the TOWER LIGHTS of UNATTENDED Microwave and Communication Stations

PHOTO ELECTRIC PANEL
Automatically turns Tower Lights ON and OFF in accordance with FCC regulations
FLASHER PANEL - Automatically flashes Beacon Lamps — with balanced load provisions.
ALARM PANEL - Automatically provides signals indicating failure of any lamp, power or control.

Model LC 201
TOWER LIGHTING CONTROL UNIT
(for Two Light Levels)
Model LC 101 (for Single Light Level)
Model LC 301 (for Three Light Levels)
Models also available with separate Alarm Signal for each Beacon Lamp.

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waves of exceptionally high frequencies—much higher than ultra high frequency—are sent distances up to 600 miles by bouncing the radio waves off ionized air layers in the troposphere.

Ace-High, which will complete the two-continent communications circuit will connect either with the Ballistic Missile Early Warning System (BMEWS) currently planned to extend into northern Scotland or the Distant Early Warning (DEW) Line's system, which will run to Iceland. Both BMEWS and the DEW line have terminal points in Alaska.

Completion date for Ace-High is not known. The system will include 41 troposcatter stations in addition to line-of-sight installations and some cables. It will run from Turkey to Greece, Italy, France, West Germany, Belgium, Denmark, Norway, Sweden, and England, stopping eventually at Iceland and Alaska.

Book Review

"HANDBOOK OF AREA SAMPLING," by John Monroe and A. L. Finkner; 64 pages; $3.00.

Area sampling has become widespread in surveys dealing with both agricultural and non-agricultural as well as analytical, and descriptive problems.

The purpose behind this book is: (1) to bring together the various definitions and procedures involved in the construction of an area frame; (2) to illustrate the use of the frame in drawing a random sample; and (3) to show the adaptability of the materials to several commonly used sample designs.

John Monroe is head of the survey operations unit in the Institute of Statistics at the University of North Carolina.

A. L. Finkner is professor in the department of experimental statistics in charge of the sampling section of the Institute of Statistics at North Carolina State College. Both are members of the American Statistical Association.

This book was scheduled for publication on Sept. 3.

It is available from the Chilton Co., Book Division, 56th and Chestnut Streets, Philadelphia 39, Pa.

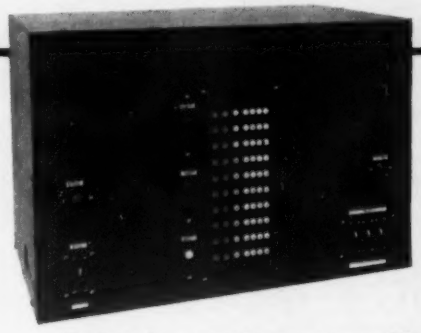
Gift of Industry

"A man who gives his children habits of industry provides for them better than by giving them a fortune."—WHATELY.

Impartiality

"Justice discards party, friendship, kindred, and is always, therefore, represented as blind."—ADDISON.

THERE IS AN ECONOMICAL WAY TO BETTER OPERATOR TRAINING AND SUPERVISION!



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Above—Chief Operator's Monitor

Above Right — Auxiliary Monitor (for Traffic Supervisor or Manager)

Designed especially for the smaller company — for checking and correcting operators' handling of calls. Constantly indicates switchboard positions occupied. Affords automatic or selective monitoring of those positions, through loudspeaker or headset, without operators' knowledge. Chief operator may speak with operator, to immediately correct errors — is warned by signal when subscriber can hear. Or, operator errors and CO's remarks can be recorded, for subsequent replay. Complete secrecy is assured. Monitoring may be "picked up" and "put aside" between CO's other duties.

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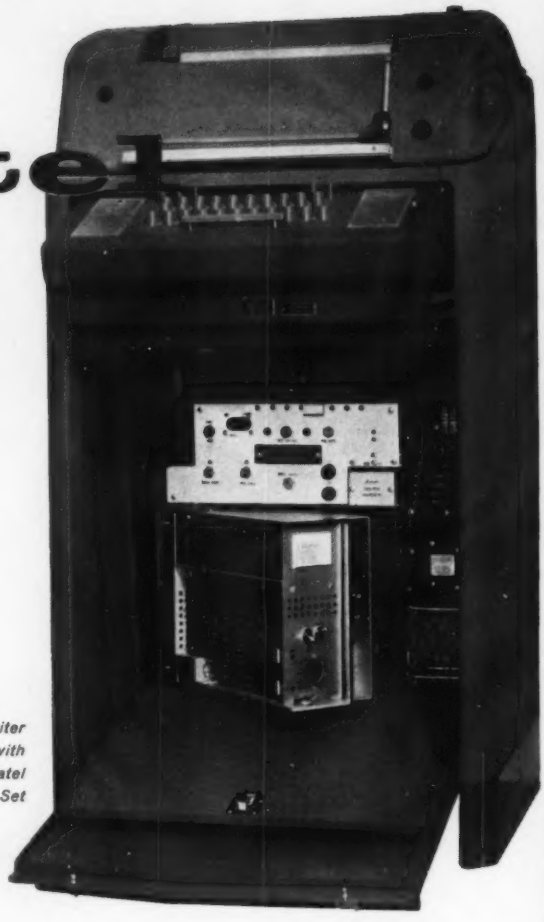

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Lenkurt Datatel is further proof that AE-Lenkurt is equipped to provide for *all* of your communication needs—planning, equipment, installation, supplies. *There's never need to look elsewhere.*

For full information on Lenkurt Datatel and companion equipment, call your Automatic Electric representative, or mail coupon today.

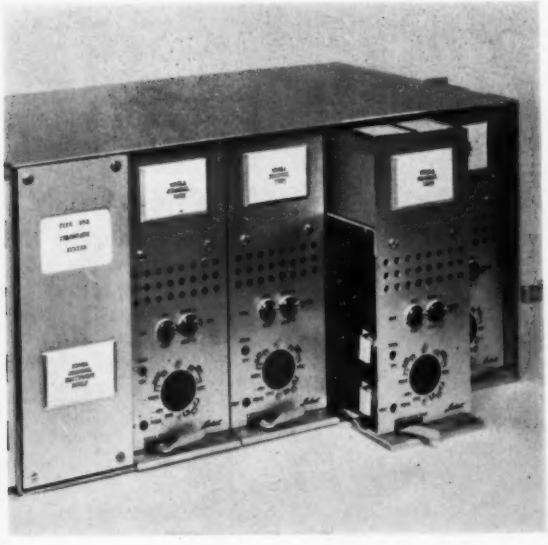
Check these features!

★ Frequency-shift telegraph carrier system with operating speeds up to 100 words per minute.

★ *Fully transistorized* equipment capable of operating directly from 48 volts d.c. (or 115-volt, 60-cycle mains if desired).

★ Low power consumption—only 2.5 watts dissipation per channel!

★ Trouble-free polar receiving relay provides greater flexibility in loop arrangements than electronic keyer.



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★ FS operation affords greatest tolerance to level changes with smaller variations in bias.

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★ *One* channel unit type is common to *all* channels. Frequency-determining networks are plug-in, simplifying spare equipment requirements.

★ Transistorized circuitry and polar relay simplify servicing. A multimeter and VTVM are normally the only test instruments required.

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Northlake, Illinois
Attention: Mr. T. B. Collins, Director, Carrier & Radio Sales

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O. E. McIntyre, Inc., Publishes National Telephone Profile

The first comprehensive study of the nation's 36.5 million telephone households was issued recently by O. E. McIntyre, Inc., New York mail marketing firm.

Data for the report, which includes information on income, occupations, ages, number of children, length of residence and other characteristics, were derived from interviews among approximately 27,000 households. The basic data was gathered and projected to national totals by the U. S. Bureau of the Census.

According to Edward MacNeal, McIntyre research director, the report is of particular importance in the market research, sales prospecting and mail marketing areas.

Mr. MacNeal continued:

"The fact of telephone ownership which sets this group apart from other households, also results in such households being listed by name in telephone directories. The availability of these names makes the telephone households of special interest to all consumer marketers whose products have more than an extremely limited appeal."

Approximately three-fourths of the 50,402,000 households in the United States have telephones. The McIntyre report shows that this group has a definite bias toward higher income and more stable family units. For example:

Median income of telephone households was $5,342, while the median income of non-telephone households was $2,570. More than 95 per cent of the households with annual incomes of $10,000 or more had telephones, while less than 50 per cent with incomes under $1,500 had telephones.

Seventy-seven per cent of the households with the head of the family in the 35-54 age bracket had telephones, while only 47 per cent of the households with heads under 25 years had telephones. Also, 79 per cent of the four-person households had telephones, but only 60 per cent of the one-person households had telephones.

The report concentrates on two basic selection techniques of interest to selective marketers. Both serve to illustrate the market subsegments that exist among these 36.5 million households.

The first technique divides the market by sex of the head of the household. The report shows, for example, that telephone households with female heads are smaller, older and have lower incomes. The median age of female heads of households is 58 years. Three-fifths of the female heads are widows, and less than one-fifth never have been married.

Approximately 97 per cent of the households with male heads, however, are family groupings, and in all but a small fraction of these, the wife of the head of the family is present.

A second broad selection technique is based on length of residence. The report identifies those telephone households whose heads have moved within the last year, and those whose residence is longer than one year. Movers are younger and have more young children, while non-movers are older and have more older children. Among movers, the median age of male heads of the family is 35 years; among non-movers, the median age is 47 years.

Among non-movers there are proportionately more children six to 13 years and adults 35 to 44 years than among movers. Among movers there are proportionately more adults 25 to 34 years, and children under six years.

These straight forward techniques were emphasized because the telephone directory, as a source list for these households, also can be used to determine sex and length of residence.

Considering the importance of the McIntyre report, Mr. MacNeal noted that telephone surveys play an important role in consumer research. He added:

"In some areas, such as television rating systems, they have a continuous impact on marketing decisions. This report should enable telephone surveyors to select markets with greater accuracy, and also to appreciate the differences between the group being surveyed and the general population."

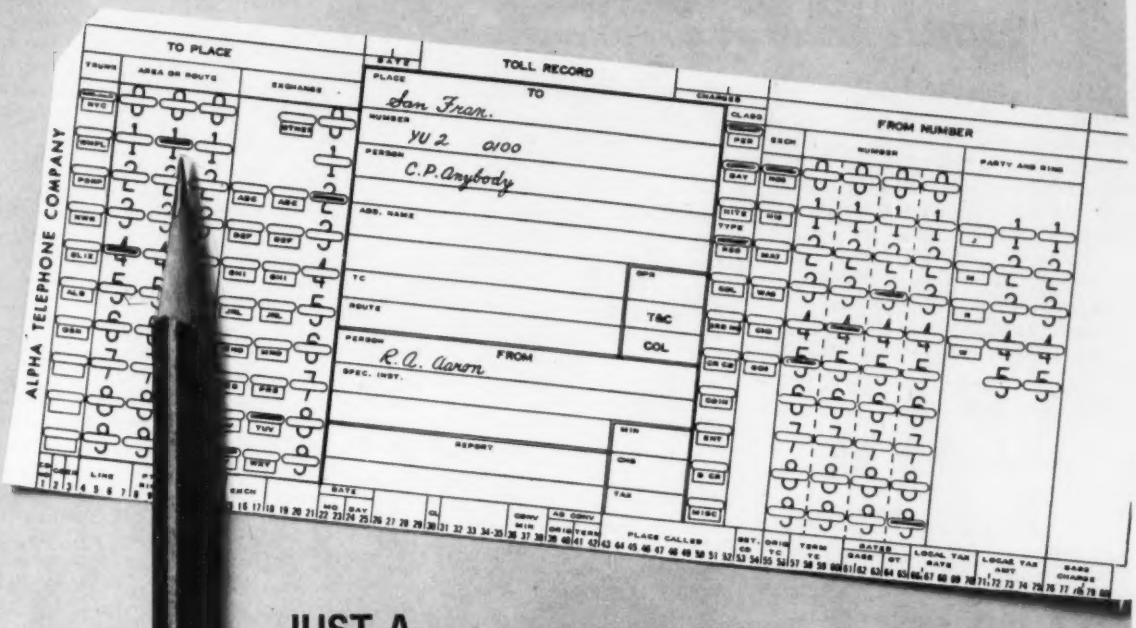
MacNeal also suggested that since sales prospecting from telephone lists is a major sales tool for some marketers, new and improved techniques might result from the knowledge of what kinds of people have telephones in different areas.

In summary: the McIntyre company states that in mail marketing, the usefulness of its report lies in four major categories: mail order, couponing and product sampling, production of sales leads, and increasing store traffic. The report is available, on a limited basis, to market research, advertising and sales personnel.

Requests for copies of *The McIntyre Report on the Characteristics of Telephone Households* should be addressed to: Edward MacNeal, Research Director, O. E. McIntyre, Inc., 375 Park Ave., New York 22, N. Y.

Enjoyment Grows Sweeter

"Sleep, riches, and health are only truly enjoyed after they have been interrupted."—RICHTER.



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Helpful Literature

POWER-INSTALLED SCREW ANCHORS—A. B. Chance Co. states that power-installed screw anchors are the subject of a new 12-page booklet titled "Mechanizing Anchor Installations."

The booklet describes how utilities power hole-boring equipment can be adapted to easily install this new line of anchors. Photos show installation procedures.

Installation time, torque and holding-power test data are included. Request HL514.

Calling All Outdoorsmen

NOW BUY THE BEST FOR LESS

Outdoor Outfitters Company can supply you with all your outdoor clothing at less cost. The same top-quality items you'd find in leading outdoor clothing stores... the only thing different is the price.
You save money because Outdoor Outfitters is a company which only sells and specializes in outerwear for the outdoorsman.

Amazing new Scott Foam makes this underwear more comfortable in the coldest weather, yet lightweight and not too hot for wear in mild weather. Keeps you warm without weight on the job. The shirt has two different snap fastener positions to adjust the length. The pants have elastic waist. Knit collarette and wristlets. Comes in tan. Sizes: S, M, L, XL. (Post paid when remittance sent with order.)

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DIESEL LINE—The entire new line of Diesel Engine-driven Electric Generating Sets, recently announced by D. W. Onan & Sons Inc., is described and illustrated in a two-color folder.

Onan points out that these heavy-duty diesel sets provide a dependable *continuous* source of electricity for all types of rugged operations, including heavy and light construction jobs.

In emergency power applications, where low-volatile diesel fuel is preferred over gasoline, the company states these new Onan diesel electric plants provide quick-starting auxiliary power for microwave installations, military requirements, and many other locations.

Specifications and illustrations of what Onan describes as compact, powerful diesel sets, in sizes ranging from 3,000 to 6,000 watts (air-cooled) and from 10,000 to 230,000 watts (water-cooled) are included in the four-page folder.

Diesel-driven marine electric generating plants are also described as are a complete selection of accessories and controls. Request HL515.

•

COMMUNICATIONS EQUIPMENT MANUFACTURING FACILITIES—General Machine Products Co., Inc. has issued a new brochure describing its facilities for the manufacture of: special machinery, tools, communications equipment, controls, electrical and electronic equipment and sub-assemblies, aircraft components and sub-assemblies, and precision parts of all types and sizes.

The company also offers design and engineering services for special machinery, tools, components and electrical and communications equipment.

General Machine's plant, located at the Philadelphia interchange of the Pennsylvania Turnpike, houses 21 metal-working operations which can be performed on the premises to expedite production. Request HL516.

•

DUAL CIRCUIT BREAKER DESIGN TRANSFER SWITCHES—A four-page illustrated bulletin which highlights an array of new relay control features of the Trans-O-Matic Automatic Transfer Switches and illustrates a new "narrow" control center model—is available from Lake Shore Electric Corp.

Designed for service to 600 volts, 800 amps. with interrupting capacities to 50,000 amps. r.m.s., the Trans-O-Matic incorporates an exclusive dual circuit breaker design that permits power to be mechanically transferred by a common motor-driven linkage. Design is said to assure positive transfer with no neutral position possible.

The switches are available for full relay, 3-phase 4-wire service with transfer initiated when any or all legs drop below 70 per cent of normal.

The unit also is available for feeder failure protection with transfer on failure of normal power. Request HL517.

•

INDUSTRIAL GLOVES—A new 16-page catalog, illustrating the complete line of Wil-Gard Industrial Gloves and Finger Cots, in color, has been published by the manufacturer, The Wilson Rubber Co., a division of Becton, Dickinson & Co.

Wil-Gard gloves are available in disposable polyethylene, natural rubber, lined and unlined latex, lined and unlined black neoprene, unlined white

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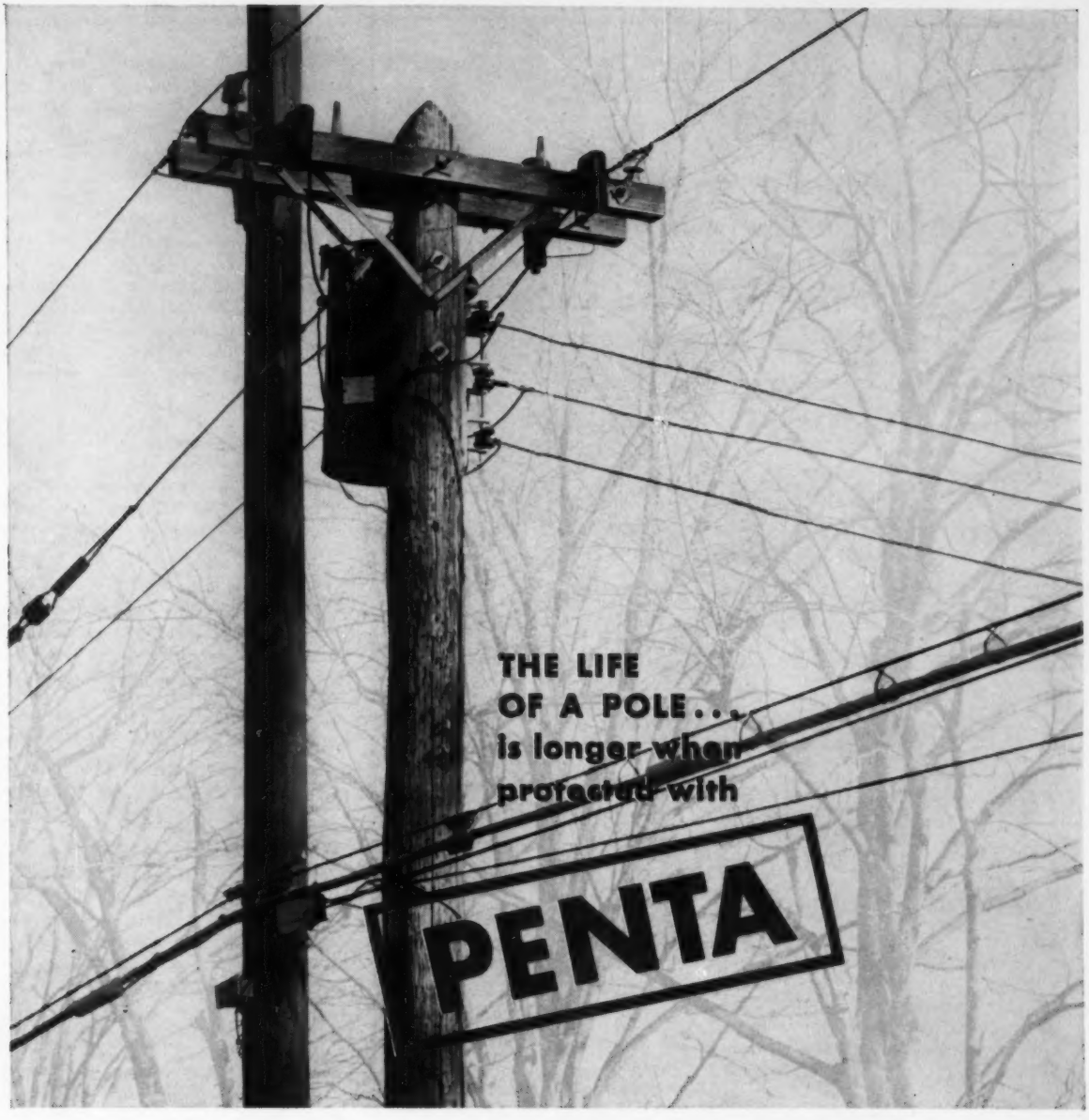

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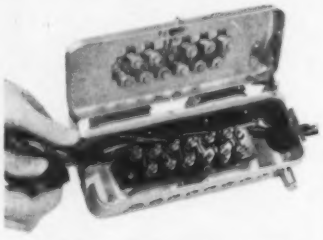

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neoprene, buna-n, and compar plastic. Wil-Gard finger cots, in various thicknesses, are made from latex or neoprene. Linemen's natural rubber gloves as well as leather protectors also are available.

The company says Wil-Gard industrial gloves are known for their wearing qualities, pliability and comfort. They are resistant to most common industrial gases, chemicals and acid solutions.

Wil-Gard gloves are made in lengths from 7½ to 21 inches; in light, medium, medium-heavy, and heavy weights; and in a wide range of sizes. Both smooth and firmhold finishes are available.

Finger cots are available in three different styles—tissue, reinforced, and compound—for use on jobs ranging from precision work to brick laying. Finger cot sizes range from 0 through 4; thumb cots from 2 through 4. Request HL518.

•

STEEL CHAIRS—A colorful new 20-page steel chair catalog has just been issued by Remington Rand Division of Sperry Rand Corp., which illustrates and describes in detail the latest steel chair models that have been added to the company's furniture line.

Of particular interest, according to the company, is the new series of posture chairs, both spring-back and rigid-back, now available. These chairs are designed to fit the individual sitting in them, not the so-called "average man."

The two major benefits of this design, Remington Rand points out, are comfort, which is the chief function of an office chair; and correct seated posture, which helps to avoid that "all-in" feeling around 4 or 5 o'clock.

Of the two basic types, the firm or rigid-back chair is designed for the girl who performs one task during the working day, such as operating a machine. The resilient or spring-back chair is for the girl who moves about in her work. It is ideal for secretaries and receptionists the company says.

In addition to executive and secretarial seating, the catalog also contains illustrations and descriptions of arm chairs and side chairs, both large and small. All chairs are available in gray-mist, heather beige, surf green, and gray-rite finishes. Request HL519.

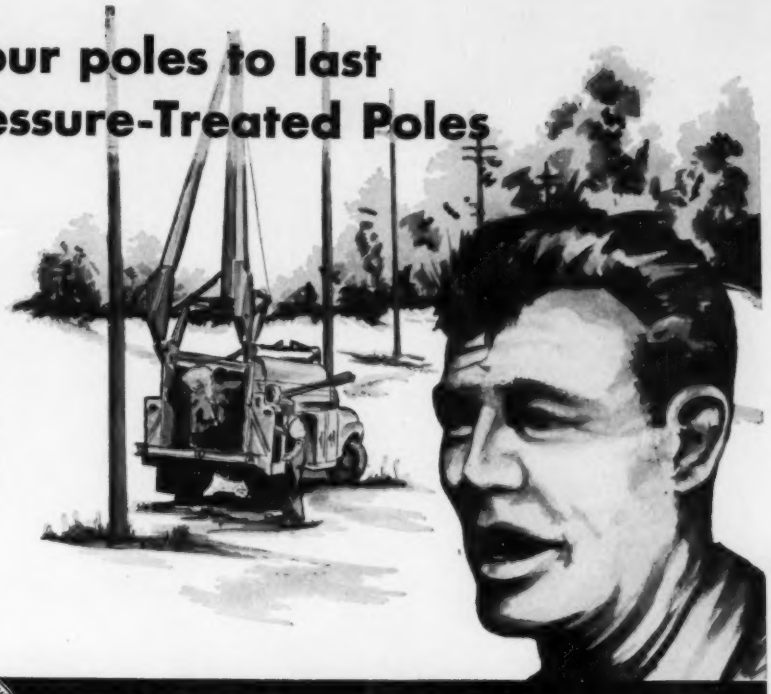
•

HELICOPTERS FOR CONSTRUCTION AND MAINTENANCE—Line patrol, construction and right-of-way maintenance by helicopter are among the topics covered by a booklet recently

(Please turn to page 156)

If you want your poles to last
Specify T-C Pressure-Treated Poles

Every pole bearing the T-C brand has received the best in preservation. "The T-C Treatment" makes them last, and give you generations of trouble-free service. Our pressure treating process (and we think you'll agree) is the best yet developed by modern Technology . . . and, only the best chemical preservatives are used. That's why we can say—Specify T-C and get the best in preservation.



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This equipment is rebuilt under the highest of manufacturing standards and to the most exacting specifications. Like all other Dan-Mac products it carries our guarantee of complete customer satisfaction. In addition to our line of completely modern equipment, we can also provide remanufactured parts for most any type of switchboard.

No ropes or chains to tangle —safety tested

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With 6-inch gongs and non-magnetic aluminum cases. Available in straight line and all frequency ringing.

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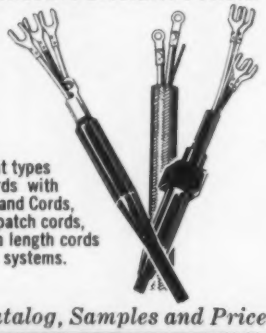
Other COMCO Cords include straight types in Switchboard and Operator Cords with Nylon jackets; Receiver and Deskstand Cords, either Neoprene or Plastic . . . also patch cords, transmitter cords, test cords, extra length cords and cords for inter-communication systems.



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QUALITY CORDS FOR ALL MAKES AND TYPES OF TELEPHONE INSTRUMENTS

PRESSURIZED CABLE SYSTEMS

The need for an automatic device to stand guard at intervals along pressurized cables has long been recognized. Now United Electric Controls has the answer . . . The Telephone Cable PRESSURE-GUARD.

Developed by U.E., in collaboration with the Bell System, the PRESSURE-GUARD is now available to all Telephone Companies as an aid in reducing cable maintenance costs.

In the past the location of a cable leak was a matter of man hours in climbing poles and manually checking pressure points. When the pressure guard detects a pressure drop it introduces an electrical resistance . . . which indicates at a central monitoring source a cable leak and the location.

Specifications Pressure-Guard

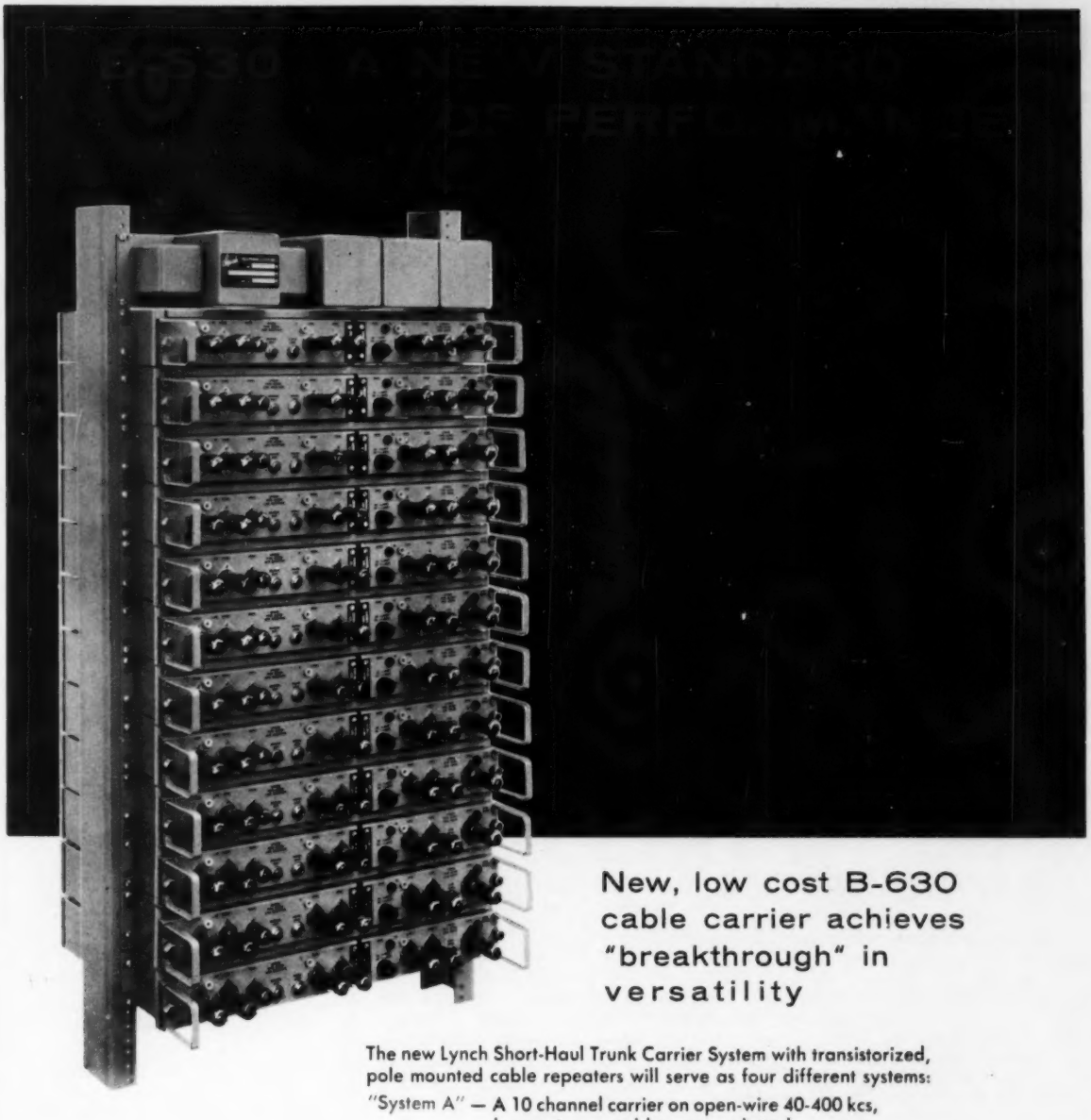
Field Adjustment Range	0 to 15 PSI
Factory Setting	2 ± ¼ PSI on falling pressure
Pressure Response	4 ± ½ oz.
Proof Pressure	30 PSI
Electric Rating	0.01 amp 110V DC
Load Resistor	Carbon composition 330,000 OHM 1 watt
Take-Off Tube	Tinned Copper 6′ x ¼″ x 0.035
Drop Wire	6′ Type SJ0 #18 stranded 0.2 conductor
Size	6″ x 4½″ x 2½″
Approximate Weight	1¾ lbs.

These specifications may be modified in a great variety of ways to meet the requirements of any given application.

See Us at the 62nd Convention of the United States Independent Telephone Association—Conrad Hilton Hotel—Chicago—October 11-14. We will be in Room 521.

U.E.® United Electric Controls COMPANY

85 SCHOOL STREET, WATERTOWN, MASS



New, low cost B-630 cable carrier achieves "breakthrough" in versatility

The new Lynch Short-Haul Trunk Carrier System with transistorized, pole mounted cable repeaters will serve as four different systems:

"System A" — A 10 channel carrier on open-wire 40-400 kcs, long entrance cables are no obstacle.

"System B" — A 5 channel carrier on open-wire, 40-208 kcs, uses half the frequency spectrum of System A.

"System C" — A 5 channel carrier on open-wire, 232-416 kcs, usable above existing single sideband systems.

"System D" — A 12 channel all-cable carrier occupying 40-416 kcs.

Request B-630 literature from Lynch or your nearest Lynch distributor

Lynch TELEPHONE SYSTEMS

LYNCH CARRIER SYSTEMS INC.
SAN FRANCISCO, CALIF.

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Our service includes the finest color posters, lobby and booth cards and a complete variety of the most timely newspaper mats as well as radio commercials and many other forms of advertising which our subscribers use to reach the public. All our advertising material is produced by top professional men working directly with active telephone operating men. It is material of the quality worthy of the largest company, yet its cost is well within the reach of even the smallest telephone exchange.

We will be happy to show you some examples of the material you will receive as a subscriber and will send it upon request and without obligation.

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released by Hiller Aircraft Corp., builders of a 305 hp helicopter (12 E) in the light utility class.

Photographs of Hiller 12 E helicopters at work in the field, brief performance specifications and information on charter operator services are also presented.

Copies of "New Workhorse for Utilities" may be obtained by requesting HL520.

•

MICROWAVE AND ANTENNA TEST SYSTEMS—Automatic testing, microwave and antenna test instrumentation, radome testing systems, and flight simulation equipment are the four categories covered in a new, 12-page two-color catalog describing the entire product line of California Technical Industries, a division of Textron Inc.

The first section includes tape-programmed circuit testers, a card-programmed component tester, a cable tester, and tape reading, punching, and duplicating devices.

Direct-reading VSWR systems, magnetron and klystron r-f supplies, and antenna pattern recording accessories such as a variable-polarization antenna and a log-linear amplifier are shown on the microwave pages.

Complete systems for automatically recording radome boresight error, per cent transmission through the radome, and antenna patterns with and without the radome are illustrated in the third section. Operation of these systems, which record directly in milliradians with an accuracy of ± 0.1 milliradian, is described.

The fourth section gives performance specifications for a dynamic altitude simulator and a computer-programmed three-axis flight simulator, both of which are used in evaluating electronic flight-control systems. A price list is also included in the catalog. Request HL521.

•

SEMICONDUCTOR DIODES—A new characteristics and replacement guide for semiconductor diodes has been made available by Sylvania Electric Products Inc., a subsidiary of General Telephone & Electronics Corp.

Richard M. Ross, manager of marketing services for Sylvania's Semiconductor Division, said the new 12-page booklet contains complete data on the ratings and electrical characteristics of all Sylvania types as well as a replacement guide to virtually all Electronic Industries Association registered diodes.

The new booklet features a section on Sylvania's latest diode manufacturing equipment including the company's

STERLING HYDRAULIC CONTROL EARTH BORING MACHINES for the Telephone Industry

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recently announced digital automatic tester and classifier which verifies up to 16 separate parameters. Request HL522.

•

MANUAL HOIST-PULLER—A new brochure telling of the specific utility company uses of Power-Pull, the manual hoist-puller that enables one man to handle up to a 1½-ton load, has been issued by American Gage & Mfg. Co. Request HL523.

Sullivan Named to Stromberg Sales Post in Ohio, W. Va.

E. F. Sullivan is now sales representative for Stromberg-Carlson's telecommunication division in Ohio and West Virginia, in a transfer of sales responsbilities announced Sept. 9 by T. C. Thompson, division general sales manager. Stromberg-Carlson is a division of General Dynamics Corp.

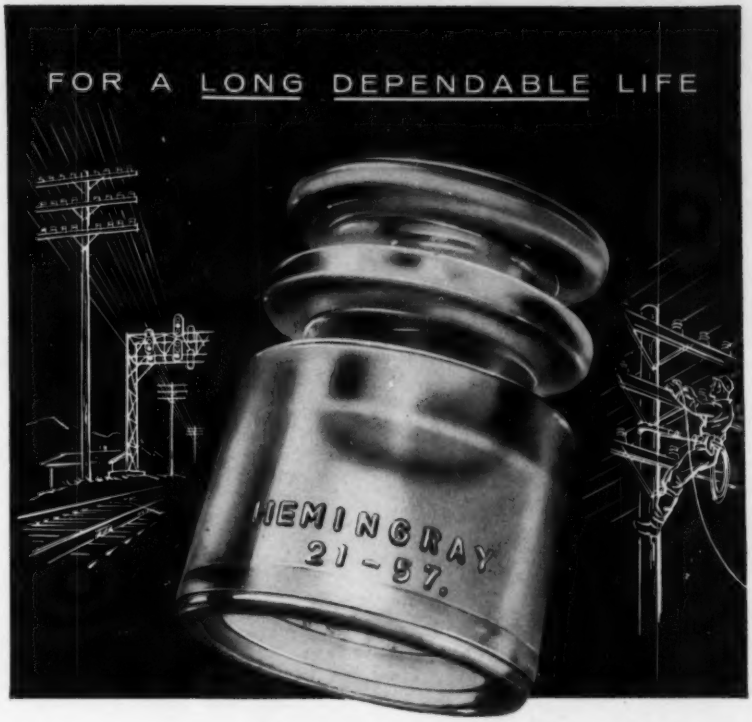
E. F. SULLIVAN

In his new assignment, Mr. Sullivan succeeds Robert E. Cleland, who recently was transferred to Stromberg-Carlson's Industrial Sales department in the southwest zone.

Sullivan joined Stromberg-Carlson in 1948 as an installer, became installation foreman, and later was advanced to service engineer on the west coast. Just prior to his new assignment, he was sales representative in eastern New York and in New England.

A native of Boston, Mr. Sullivan attended the public schools in Arlington, Mass., and studied law at Harvard University before accepting a position with the New England Telephone & Telegraph Co.

A five-year veteran of the U. S. Air Force, he served in the Pacific and Asiatic commands.



NUMBER TS-23 - *Designed for carrier circuit use on all "point" type transposition hardware and at intervening non-transposition poles.*

HEMINGRAY INSULATORS

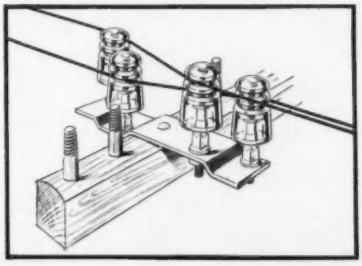
Easily and Economically Installed

Hemingray Glass Insulators stand up under severe conditions, do not deteriorate, provide the service you need to assure continuous operation of communication lines. The dependability of Hemingray Insulators as proved by years of fine performance is one of the reasons behind their world-wide acceptance.

Hemingray has pioneered many insulator developments to keep pace with requirements, improve communication systems, assure you a dependable source of supply.

An up to date distribution system makes Hemingray Insulators available when you want them and where you need them.

Hemingray Glass Insulators are a product of Kimble Glass Company, subsidiary of Owens-Illinois, Toledo 1, Ohio.



This carrier circuit transposition developed by the Bell System takes only the crossarm width of one conventional pin.

World standard for quality Since 1870

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RINGS THE WORLD

LEAD-SHEATHED FOR LIFETIME SERVICE

proven by more than 8 billion feet in USE in U.S.A.!

- Used by the country's largest single telephone system
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- Highest quality copper conductor and paper insulation
- Disposable reels—no return charges
- Exceeds all standards of modern telephony
- Backed by both Kellogg and ITT

Ask your Kellogg representative for complete details.

Basic Specifications	26 AWG	24 AWG	22 AWG	19 AWG
Sheath: lead with 1% antimony				
Conductor: pure copper wire				
Conductor Resistance max. ohms/mile @ 20°C	230	145	92	46
Mutual Capacitance 900 cycles A.C., mfd/mile, max.	0.080	0.080	0.090	0.084
Capacitance Unbalance 900 cycles A.C., micro-microfarads	*	*	at 22 AWG: up to 1000′—100; 1001′ to 2000′—150; 2001′ and longer—200	at 19 AWG: up to 1000′—100; 1001′ to 2000′—150; 2001′ and longer—200
Dielectric Strength: 60 cycles A.C., for 2 sec., volts rms conductor-to- conductor-to- sheath	355	355	355	500
core-to- sheath	850	1000	1000	1000

Insulation Resistance: not less than 1,000 megohm-miles at 60°F measured with a D.C. potential of 100 to 550 volts.

*not required, except if adjacent pairs are found with like lengths of twist when the 900 cycle A.C. capacitance unbalance shall not exceed 400 micro-microfarads.

KELLOGG Communications Division of IT

Kellogg Switchboard and Supply Company, 6650 South Cicero Avenue
Chicago 38, Ill. Communications division of
International Telephone and Telegraph Corporation

For complete list of Kellogg offices, see pages 6-7

Probst Is Comptroller, Treasurer of Kellogg

Worth Probst has been appointed comptroller and treasurer of the Kellogg Switchboard & Supply Co., communications division of International Telephone & Telegraph Corp.

WORTH PROBST

A past president of the National Association of Cost Accountants, Mr. Probst joins Kellogg from Carrier Corp., Syracuse, N. Y. He has been comptroller of that company since 1951.

From 1945 to 1951, he headed his own accounting firm at Rochester, N. Y., after serving as assistant comptroller and budget director for Bausch & Lomb Optical Co., Rochester.

Mr. Probst is a native of Rochester, N. Y., and a graduate of St. Lawrence University.

W. D. Leonard Heads Philco Communications Sales

W. Dale Leonard has joined Philco Corp.'s Government & Industrial division as manager of communications sales.

He will be responsible for all sales activities pertaining to communications equipment and systems for government agencies.

Mr. Leonard was formerly manager of the government and industrial sales department at Lenkurt Electric Co., Inc. where he started as an applications engineer in 1951.

He also worked for the Western Electric Co. both before and after his World War II service with the Army Signal Corps.

A native of Evansville, Ind., Mr. Leonard attended the University of San Francisco.

SAVE TEST TIME . . . and $ $

MODEL TTS 4A
Basic Test Set

NORTHEAST ELECTRONICS' NEW PORTABLE TRANSISTORIZED TRANSMISSION TEST EQUIPMENT

to simplify precise transmission measurements on equipment, exchange lines, toll circuits, FAA and other special service lines.

NOW IN USE BY BELL AND INDEPENDENT TELEPHONE COMPANIES

FEATURING

- High Accuracy
- Self Calibrating
- Switches to Send, Receive and Talk
- 600/900 Ohms Impedances
- Holding Coil and Dial Jack
- Hook Switch Control on Line
- Incoming Call Indicator
- Measures dbm and VU
- Monitor Switch
- Self Powered
- Compact - 11" x 8" x 7"
- Light Weight - 17 LBS.

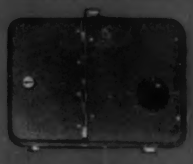
ACCESSORIES

COVERS FOR EXTENDING SCOPE OF APPLICATION

MODEL TTS 4XD

Has dial, hookswitch, headset compartment, mounts ringer

MODEL TTS 4XM



Has 30 send frequencies for FAA circuits, headset compartment

MODEL TTS 4XB

High impedance matching amplifier for bridging VU measurements

MODEL TTS 4XR - RACK MOUNTING ADAPTOR - STATION BATTERY POWER SUPPLY AVAILABLE

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28 Foot Extension 49 lbs. | 24 Foot Extension 45 lbs. | 20 Foot Extension 38 lbs.

All Ladders Complete

New Pat. Pend. RUNG LOCK for fast action. Lock snaps on first rung when rope is released. NO RUN-AWAY LADDERS.

IT'S SAFE—IT'S STRONG AND DURABLE
IT'S LIGHTWEIGHT AND EASIER TO HANDLE
ALL LADDERS are TESTED and GUARANTEED with a 4 to 1 safety factor (U. S. Standard of Ladders Test).

HIMCO THE ONLY LADDER
BUILT WITH YOUR LIFE IN MIND

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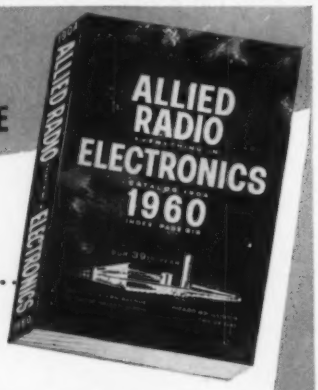

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our 39th year

send for FREE catalog

Leich Names Davis, Bolger Sales Representatives

D. C. Gibson, president, has announced the appointment of two new Leich sales representatives.

D. A. DAVIS

Daniel A. Davis has been named Leich's new representative in Iowa. He succeeds Arthur A. Schneider, Leich's representative in Iowa for over seven years, who has been appointed the company's switchboard sales manager.

Mr. Davis has been assistant to the manager of Leich's Motor Vehicle Department for over two years.

J. J. BOLGER

Also announced was the appointment of John J. Bolger as Leich's representative in New York and eastern Pennsylvania.

Mr. Bolger has been assistant to the manager of Leich's west central and southwestern districts for two years. He is a graduate of Notre Dame University with a bachelor of science degree in business administration.

Patent Pending

TBM SERVICE ENTRANCE MAST for OUTDOOR TELEPHONE BOOTHS

Model TBM Service Entrance Mast provides complete service entrance facilities for outdoor telephone booths with the definite plus advantages of lower cost and easier installation. Raises power lines for specified ground clearance. Looks better, lasts longer, costs less than any comparable installation.

FITS MOST MODELS OF OUTDOOR BOOTHS

MEETS ALL REQUIREMENTS

LOOKS BETTER

The TBM Mast is engineered for the job. Adds to the appearance of any style booth.

LASTS LONGER

Heavy gauge steel tubing used throughout for life-time service. Only heavy duty fittings used.

COSTS LESS

Actual installations show savings up to two-thirds over conventional pole and 4" x 4" installations.

Utility Service Co., Inc.

1620 THIRTEENTH STREET **RACINE, WISCONSIN**

For sure telephone cable support use

CF&I Galvanized Steel Strand

The Image of CF&I—a giant steelman—stands for continually improved steel products for all industries. One of these dependable products is CF&I Galvanized Steel Strand which provides years of trouble-free support for aerial cables.

Strong yet flexible, CF&I Strand is easy to install. An "envelope" of zinc acts like a raincoat on this messenger, protecting it against corrosion.

Also used for guying, CF&I Galvanized Steel Strand made in seven- and three-wire constructions meets ASTM Specification A-122. Or it can be made to your individual specifications. For prompt delivery, call the nearby CF&I sales office or contact your local distributor.

6772-A

CF&I STEEL

GALVANIZED STEEL STRAND

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

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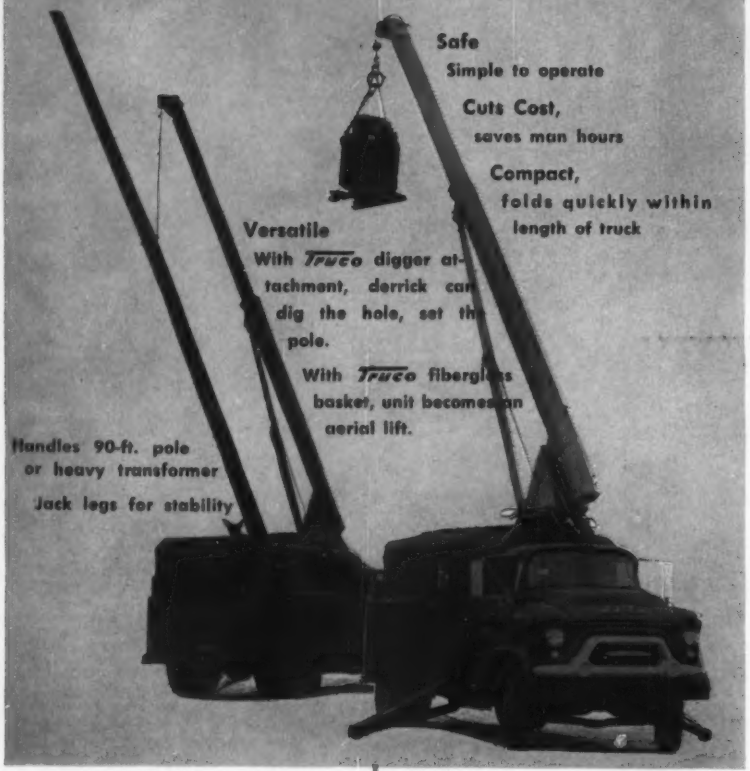
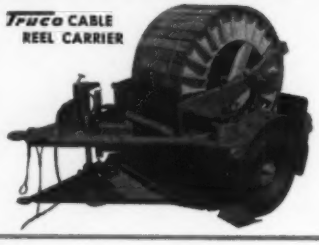
GIVES 3-DIMENSIONAL CONTROL

Safe
Simple to operate
Cuts Cost,
saves man hours
Compact,
folds quickly within
length of truck
Versatile
With Truco digger attachment, derrick can dig the hole, set the pole.
With Truco fiberglass basket, unit becomes an aerial lift.
Handles 90-ft. pole or heavy transformer
Jack legs for stability



Truco AERIAL LADDER

Truco CABLE REEL CARRIER



Truco AERIAL LIFT

Truco DERRICK

Write or phone for full details
Truco
Ask for name of nearest distributor
TRUCK Equipment COMPANY
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Leslie H. Warner, who recently was elected a member of the board of directors of Sylvania Electric Products, Inc. Mr. Warner, who is executive vice president — manufacturing of GT&E, succeeds the late Richard L. Bowditch on the Sylvania Board.

Begin Work on Raytheon's New Microwave Device Plant

Construction has begun on Raytheon Co.'s sixth building to be located along Route 128, Boston's "electronics highway." The newest building is a 30,000-square-foot structure on a 2½-acre site for Raytheon's special microwave device subdivision.

Scheduled for completion early in 1960, the new building will initially house approximately 100 employes in research and development, production, sales, and administrative positions.

The special microwave device subdivision of Raytheon's industrial apparatus division develops and produces ferrite devices which are finding increasing applications in radar and communications systems where they are used to control microwave energy.

By use of the special properties of new ferrite materials, microwave energy can be controlled magnetically with no moving parts.

The subdivision, which has been quartered at 100 River St., Waltham, Mass., is headed by Dr. Howard Scharfman.

Weapons of the Mind

"From the hour of the invention of printing, books, and not kings, were to rule the world. Weapons forged in the mind, keen-edged, and brighter than a sunbeam, were to supplant the sword and battleaxe."—WHIPPLE.

A
Directory
for the
Calhoun County Telephone Co.

Printed by

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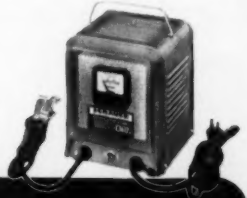
350 East Twenty-second Street, Chicago 16

SCHAUER CHARGERS



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It's like money in the bank when you put Schauer Battery Chargers to work in your garages. You'll keep your service car and truck batteries always at peak charge, ready for instant starts. You'll cut dead battery delays to zero . . . get far longer battery life . . . save real money on battery replacements. There's an economical, dependable Schauer Charger for every need . . . quality-built by the manufacturer of Schauer (Electrox) Rectifiers for the Telephone Industry! Write for Bulletin No. 2492.

Automotive Division

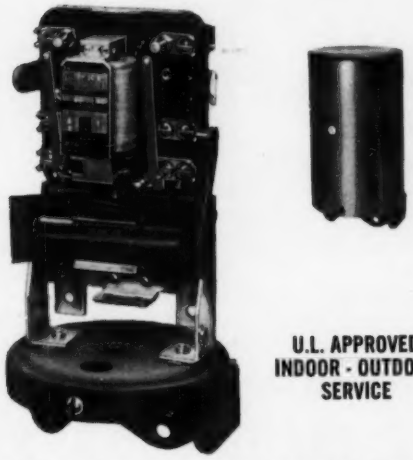
SCHAUER MANUFACTURING CORP.

4514 Alpine Avenue, Cincinnati 42, Ohio

NEW FROM

Wheelock

universal extension signaling relay sets



U.L. APPROVED INDOOR - OUTDOOR SERVICE

Wheelock Signals famous family of Extension Signaling Relay Sets is now offered in an all new aluminum indoor-outdoor housing. Lighter, easier to handle and install with convenient access to coil and contact terminals, these sets present a modern streamlined economical "new look" to the extension signaling field.

These are the most sensitive, durable and dependable ringing relays on the market, and meet the stringent electrical and impedance requirements of the Bell System.

Whether your problem is extension of telephone coverage in noisy areas, operation of remote visual or audible signals or control of municipal sirens, whistles or horns — Wheelock Extension Signaling Relay Sets meet your requirements.

write for DESCRIPTIVE BULLETIN CRT.

Wheelock SIGNALS INC

LONG BRANCH, N. J.

Graybar Names Sales, District, Branch Managers

D. L. Pulliam has been appointed general commercial sales manager at Graybar Electric Co. Inc.'s executive offices in New York, according to an announcement by R. B. Sayre, vice president in charge of apparatus and supply sales.

A. C. Hughes will succeed Mr. Pulliam as manager at Oklahoma City, W. B. Whaley, Graybar's midwestern district manager, stated.

A. L. Layer has been appointed Ohio Valley district sales manager for the Graybar Electric Co., Inc., according to an announcement by H. G. Cook, district manager.

Mr. Layer, who has been with Graybar since 1918, was formerly Dayton, O. branch manager.

He is succeeded in Dayton, by C. C. McGraw, who had held the position of Houston manager of supply sales.

In Graybar's Gulf Coast district, D. E. Clisbee has been named district sales manager. His appointment was announced by V. R. Young, manager of the Gulf Coast district.

In his prior post, Mr. Clisbee had been general commercial sales manager at the New York headquarters.

J. E. Fontaine, southern district manager, reported that L. A. Womeldorf, a 33-year veteran with the company, has been named manager at Knoxville. He had been manager at Birmingham.

Northwestern District Manager J. P. Lawton announced that R. F. Murtha has been named operating manager at Butte, Mont. Mr. Murtha had been an office salesman.

LINE CONSTRUCTION • CABLE SPLICING
CENTRAL OFFICE INSTALLATION
STATION INSTALLATION • PLANT ENGINEERING

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CLEANING CLOTHS* and SWEEPING TOOL
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* They are fire retardant and contain a germicide

WHAT COMMUNICATION WORKERS NEED TO KNOW ABOUT Electricity . . .

Second Edition Just Published

The communications worker who needs reliable, quick knowledge of fundamentals of electrical engineering has in this book all the explanations, illustrations, and applications of electricity he needs in his job. *The explanations and illustrations are taken from the communication field itself*—from telegraphy, telephony, radio and television.

THE ELECTRICAL FUNDAMENTALS of COMMUNICATION

• by Arthur Lemuel Albert
Professor of Communication Engineering, Oregon State College
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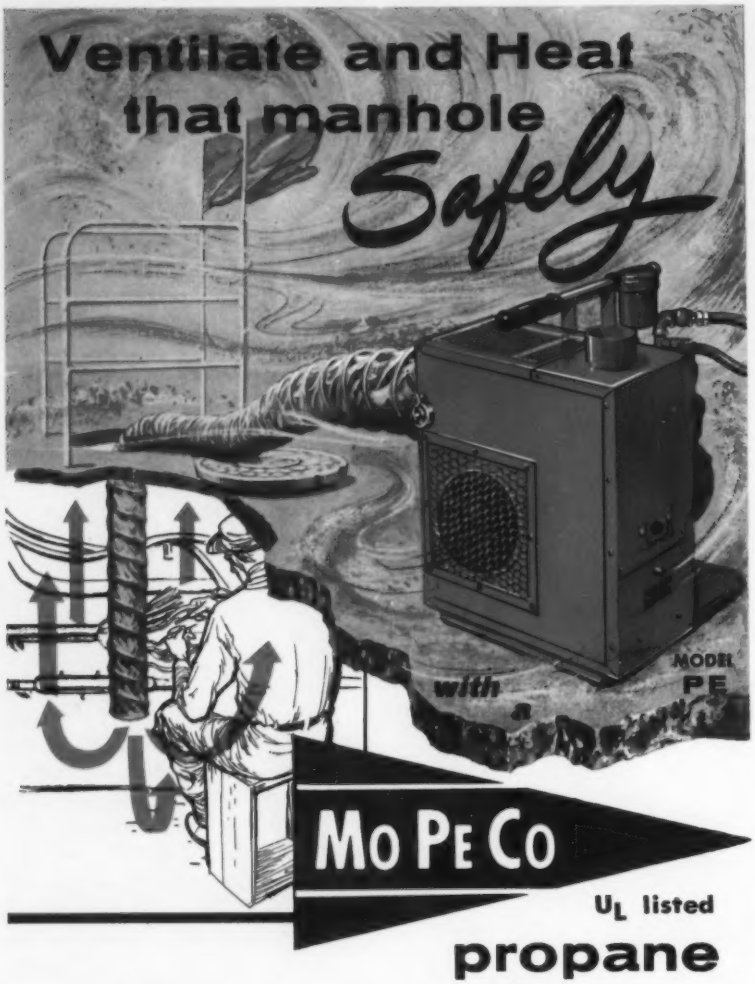

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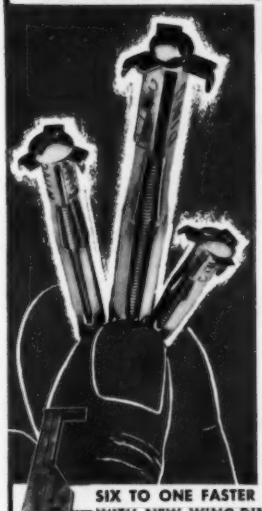

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